FAX

TECHLAW, INC.
3115 Loma Court
Tenino, WA 98589
509-521-6693

To: Steve Trent

From: Bruce Christian

Pages: 1

Date: 26 November 2003

Information Request #1

WSCF20030459-All
WSCF20030461-All
WSCF20030613-All
WSCF20030757-All
W03975

Detection limits - Do I need to use the Soil High or Soil Low detection limits

Use the Soil Low detection limits.

FAX

TECHLAW, INC.

3115 Loma Court
Tenino, WA 98589
509-521-6693

To: Steve Trent

From: Bruce Christian

Pages: 1

Date: 26 November 2003

Information Request #2

WSCF20030459-All
WSCF20030461-All
WSCF20030613-All
WSCF20030757-All
W03975-All

I need a complete reference for DOE/RL 2000-60 Rev. 1

Put on CD and shipped via Federal Express on 09/29/03

FAX

TECHLAW, INC.

3115 Loma Court
Tenino, WA 98589
509-521-6693

To: Steve Trent

From: Bruce Christian

Pages: 1

Date: 26 November 2003

Information Request #5

WSCF20030459 - Metals
WSCF20030461 Dayies
WSCF20030613
WSCF20030757

The method reported for almost all of the metal analysis does not match the analysis in the SAP 96010B versus EPA 200.8). Do the same detection limits still apply??

Yes, the same detection limits apply.

FAX

TECHLAW, INC.

3115 Loma Court
Tenino, WA 98589
509-521-6693

To: Steve Trent

From: Bruce Christian

Pages: 1

Date: 26 November 2003

Information Request #6

WSCF20030459 - rAD
WSCF20030461 X Bayes
WSCF20030613
WSCF20030757

The lab reported alpha and bet by liquid scintillation but there is no QC data present. The chain-of-custody does not request the analysis. Do you want it validated.

No

FAX

TECHLAW, INC.

3115 Loma Court
Tenino, WA 98589
509-521-6693

To: Steve Trent

From: Bruce Christian

Pages: 1

Date: 26 November 2003

Information Request #7

WSCF20030461 - RAD-Rerun data

The lab reported americium-2419gea) as 1.88 e-010. That seems like an awfully small number. Is it correct?

Please see data package WSCF20031181 (dated 10/17/03).

FAX

TECHLAW, INC.

3115 Loma Court
Tenino, WA 98589
509-521-6693

To: Steve Trent

From: Bruce Christian

Pages: 1

Date: 26 November 2003

Information Request #11

WSCF20030459-rad
WSCF20030461-rad
WSCF20030613-rad
WSCF20030757-rad

I'm not seeing any tracer/carrier yield data reported by WSCF. Is it in the package somewhere and I'm just not seeing it??

Information received from the laboratory and forwarded to Techlaw on 11/13/03

FAX

TECHLAW, INC.

3115 Loma Court
Tenino, WA 98589
509-521-6693

To: Steve Trent

From: Bruce Christian

Pages: 1

Date: 26 November 2003

Information Request #12

WSCF20030461 - Wet Chem #

The lab reports the fluoride RPD as 69%, but the MS/MSD RPD I calculated is just a few percent? Did the lab run a separate duplicate?

Here is the e-mail response that Steve received from the lab.

Doris here are answers to IR #12 and IR #9.

Steve
-----Original Message-----
From: Fitzgerald, Scot L
Sent: Wednesday, October 29, 2003 1:35 PM
To: Trent, Stephen J
Cc: Trechter, John E Jr.
Subject: FW: Some more data validation questions...

Steve,

Here is the information you requested. For Item number one there are two RPDs one for the sample/dup and one for the MS/MSD. The RPD differences would be expected under the conditions discussed below.

Scot
-----Original Message-----
From: Baird, William W (Bill)
Sent: Wednesday, October 29, 2003 12:37 PM
To: Fitzgerald, Scot L
Subject: RE: Some more data validation questions...

1. The fluoride peak was noted in the comments to have an unidentified compound possibly interfering. The fluoride is flagged with a B and an X. The B is for the concentration being below the lowest cal std but above the MDL, the X is for the possible interfering peak. Here is a quote of the comments:
"IC: Fluoride, nitrite-N and phosphate-P detected, but at
concentrations less than that of the lowest calibration
level. Also unknown peak potentially interfering with
fluoride, which is why matrix spike recoveries and the
relative percent difference between the sample and dup are
high. "
The MS is 127% and the MSD is 120%. This could be accounted for if the sample result was biased low due to the possible interference.

I don't see any reference to a "few percent" in any of the comments in Labcore.

2. The MSD was not spiked (analyst error). Thus, it was not reported. If necessary, we can resurrect and report the unspiked result which could be used as a DUP of the sample.

Bill

-----Original Message-----
From: Fitzgerald, Scot L
Sent: Tuesday, October 28, 2003 3:30 PM
To: Baird, William W (Bill)
Subject: FW: Some more data validation questions...

Bill,

Can you look into these for me?

Scot
-----Original Message-----
From: Neely, Michael
Sent: Tuesday, October 28, 2003 2:41 PM
To: Dale, Troy F; Fitzgerald, Scot L
Cc: Trechter, John E Jr.
Subject: FW: Some more data validation questions...

Troy/Scot:

More questions from Steve - please see below e-mail message.

Thanks,
Mike Neely
Phone: 509-373-0654
Cell: 509-528-2666
Pager: 509-373-PAGE, Extension 6730
FAX: 509-372-0456

-----Original Message-----
From: Trent, Stephen J

Sent: Tuesday, October 28, 2003 2:12 PM
To: Neely, Michael
Subject: Some more data validation questions...

Mike,

Some more questions from the validator -

1) WSCF20030461 - The lab reports the fluoride RPD as 69%, but the MS/MSD RPD calculated by the validator is just a "few percent". Did the lab run a separate duplicate?

2) WSCF20030757 - No MSD or lab duplicate data was provided for metals analysis is it available or was there a reason it is not presented in the data package?

Thanks in advance..

Steve

ORP-114
(02/02)

ORP - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
Nov 25, 2003	N/A
3. Project No.	4. Page 1 of 1
200-PW-2 & 4	

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Data Package SDG 30461	Groundwater Protection program/200-PW-2 & 4 OU	Bill Thackaberry	Env & Science Assurance (QA)	E6-35 372-0742

17. Comment Submittal Approval	10. Agreement with indicated comment disposition(s)	11. CLOSED
Organization Manager (optional)	W R Thackaberry Reviewer/Point of Contact 12-16-03 Date	W R Thackaberry Reviewer/Point of Contact 12-16-03 Date
	Requester	Requester

12. Item	13a. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted). Provide separate attachments if necessary.	16. Status
1	Inorganics - pg 1, TechLaw validation letter, introduction cites DOE/RL-2000-60 Draft B. However Rev 1 is in effect and is cited on pg 4.		Correct	C
2	Radiochemistry - pg 1, TechLaw validation letter, introduction cites DOE/RL-2000-60 Draft B. However Rev 1 is in effect and is cited on pg 4.		Correct	C
3	Radio Chemistry - Pg 2, Laboratory Blanks, It appears that the blank contamination affecting B16RX9 should also apply to B16XR8 too.		the typo was corr	C
4	Radio Chemistry - Pg 3, Minor deficiencies, It appears that the blank contamination affecting B16RX9 should also apply to B16XR8 too.		See # 3	C
5	Radiochemistry - pg 32, 5. Blanks comment, It appears that the blank contamination affecting B16RX9 Lead 214 should also apply to B16XR8 Lead 214 too.		rejected - the lead 214 results in RX8 is >5X the blank level.	C
6	Semivolatiles - pg 1, TechLaw validation letter, introduction cites DOE/RL-2000-60 Draft B. However Rev 1 is in effect and is cited on pg 4A.		Correct	C
7	Volatiles - pg 1, TechLaw validation letter, introduction cites DOE/RL-2000-60 Draft B. However Rev 1 is in effect and is cited on pg 4.		Correct	C
8	Wet Chemistry - pg 1, TechLaw validation letter, introduction cites DOE/RL-2000-60 Draft B. However Rev 1 is in effect and is cited on pg 4.		Correct	C

Date: 17 November 2003
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling
Subject: Semivolatile - Data Package No. WSCF20030461 (SDG No. 30461)

INTRODUCTION

This memo presents the results of data validation on Data Package No. 30461 prepared by WSCF. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16RX8	4/4/03	Soil	C	See note 1
B16RX9	4/4/03	Soil	C	See note 1

1-Semivolatiles by 8270B; TPH-G and TPH-D by 8015.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times/Sample Preservation**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, all diethylphthalate results were qualified as undetected and flagged "U".

All other method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike

Matrix spike/matrix spike duplicate and blank spike sample analyses are used to assess the analytical accuracy of the reported data. Matrix spike/matrix duplicate results are used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within

laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike/matrix spike duplicate and blank spike results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to the lack of a surrogate analysis, all TPH-gasoline results were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All MS/MSD RPD results were acceptable.

Field Duplicate Samples

No field duplicate results were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the target quantitation limits (TQL's) to ensure that laboratory detection levels meet the required criteria. All results met the analyte specific TQL.

- **Completeness**

Data package No. 30461 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to method blank contamination, all diethylphthalate results were qualified as undetected and flagged "U". Due to the lack of a surrogate analysis, all TPH-gasoline results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the FHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

SEMIVOLATILE DATA QUALIFICATION SUMMARY

SDG: 30461	REVIEWER: TLI	DATE: 11/17/03	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
TPH-G	J	All	No surrogate analysis
Diethylphthalate	U	All	Blank contamination

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, WATER MATRIX, (UG/KG) Page__1__ of__3__

Project: FLUOR-HANFORD									
Laboratory: WSCF									
Case:	SDG: WSCF20030461								
Sample Number		B16RX8		B16RX9					
Remarks									
Sample Date		4/4/03		4/4/03					
Analysis Date		4/18/03		4/22/03					
Semivolatile (8270B)	TQL	Result	Q	Result	Q	Result	Q	Result	Q
1,2,4-Trichlorobenzene		<310	U	<310	U				
1,2-Dichlorobenzene		<380	U	<370	U				
1,3-Dichlorobenzene		<340	U	<330	U				
1,4-Dichlorobenzene		<330	U	<330	U				
2,4,5-Trichlorophenol		<710	U	<76.0	U				
2,4,6-Trichlorophenol		<71.0	U	<69.0	U				
2,4-Dichlorophenol		<85.0	U	<83.0	U				
2,4-Dimethylphenol		<71.0	U	<69.0	U				
2,4-Dinitrophenol		<710	U	<230	U				
2,4-Dinitrotoluene		<71.0	U	<69.0	U				
2,6-Dinitrotoluene		<71.0	U	<69.0	U				
2-Butoxyethanol		<110	U	<100	U				
2-Chloronaphthalene		<85.0	U	<83.0	U				
2-Chlorophenol		<160	U	<150	U				
2-Methylnaphthalene		<190	U	<190	U				
2-Methylphenol		<71.0	U	<69.0	U				
2-Nitroaniline		<71.0	U	<69.0	U				
2-Nitrophenol		<180	U	<180	U				
3 & 4-Methylphenol (total)		<120	U	<120	U				
3,3-Dichlorobenzidine		<85.0	U	<83.0	U				
3-Nitroaniline		<71.0	U	<69.0	U				
4,6-Dinitro-2-methylphenol		<710	U	<690	U				
4-Bromophenyl-phenyl ether		<71.0	U	<69.0	U				
4-Chloro-3-methylphenol		<71.0	U	<69.0	U				
4-Chloroanaline		<99.0	U	<97.0	U				
4-Chlorophenyl-phenyl ether		<71.0	U	<69.0	U				
4-Nitroaniline		<260	U	<260	U				
4-Nitrophenol		<690	U	<670	U				
Acenaphthene		<71.0	U	<69.0	U				
Acenaphthylene		<85.0	U	<83.0	U				
Anthracene		<71.0	U	<69.0	U				

0010000

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Project: FLUOR-HANFORD									
Laboratory: WSCF									
Case:	SDG: WSCF20030461								
Sample Number		B16RX8		B16RX9					
Remarks									
Sample Date		4/4/03		4/4/03					
Analysis Date		4/18/03		4/22/03					
Semivolatile (8270B)	TQL	Result	Q	Result	Q	Result	Q	Result	Q
Benzo-a-anthracene		<71.0	U	<69.0	U				
Benzo-a-pyrene		<71.0	U	<69.0	U				
Benzo(b)fluoranthene*		<71.0	U	<69.0	U				
Benzo(g,h,i)perylene		<71.0	U	<69.0	U				
Benzo(k)fluoranthene*		<71.0	U	<69.0	U				
bis(2-Ethylhexyl)phthalate		620		<580	U				
Bis(2-Chloro-1-methylene)		<270	U	<260	U				
Butylbenzylphthalate		<71.0	U	<69.0	U				
Carbazole		<85.0	U	<83.0	U				
Chrysene		<71.0	U	<69.0	U				
Di-n-butylphthalate		<92.0	U	<90.0	U				
Di-n-octylphthalate		<71.0	U	<69.0	U				
Dibenz(a,h)anthracene		<71.0	U	<69.0	U				
Dibenzofuran		<71.0	U	<69.0	U				
Diethylphthalate		1100	U	1000	U				
Dimethylphthalate		<71.0	U	<69.0	U				
Fluoranthene		<71.0	U	<69.0	U				
Fluorene		<71.0	U	<69.0	U				
Hexachlorobenzene		<71.0	U	<69.0	U				
Hexachlorobutadiene		<390	U	<380	U				
Hexachlorocyclopentadiene		<330	U	<330	U				
Hexachloroethane		<500	U	<490	U				
Indeno(1,2,3-cd)pyrene		<71.0	U	<69.0	U				
Isopherone		<71.0	U	<69.0	U				
N-Nitroso-di-n-propylamine		<71.0	U	<69.0	U				
N-Nitrosodiphenylamine		<71.0	U	<69.0	U				
Naphthalene		<300	U	<300	U				
Nitrobenzene		<280	U	<270	U				
Pentachlorophenol		<320	U	<310	U				
Phenanthrene		<71.0	U	<69.0	U				
Phenol	330	<110	U	<100	U				
Pyrene		<71.0	U	<69.0	U				
Tri-n-butylphosphate	330	94.0		100					
bis(2-Chloroethyl)Eth		<260	U	<260	U				
bis(2-Chloroethoxy)methane		<120	U	<120	U				

E1000

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

SEMIVOLATILE ANALYSIS, WATER MATRIX, (UG/KG) Page__3__ of__3__

Project: FLUOR-HANFORD									
Laboratory: WSCF									
Case:	SDG: WSCF20030461								
Sample Number		B16RX8		B16RX9					
Remarks									
Sample Date		4/4/03		4/4/03					
TPH	TQL	Result	Q	Result	Q	Result	Q	Result	Q
Kerosene	5000	<4200	UJ	<4200	U				
TPH-Diesel	5000	7800	J	<4200	U				
TPH-Gasoline	5000	<250	UJ	<250	UJ				

000011A

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

WSCF
ANALYTICAL RESULTS REPORT

2-6

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	7440-50-8	Copper by ICP-MS	SOLID	LA-505-412		12.9	ug/g	0.49	0.24	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-92-1	Lead by ICP-MS	SOLID	LA-505-412		2.80	ug/g	0.49	0.58	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-96-5	Manganese by ICP-MS	SOLID	LA-505-412		433	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-97-6	Mercury by ICP-MS	SOLID	LA-505-412	U	< 0.0486	ug/g	0.49	0.049	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-98-7	Molybdenum by ICP-MS	SOLID	LA-505-412	E	1.54	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-02-0	Nickel by ICP-MS	SOLID	LA-505-412		6.25	ug/g	0.49	0.24	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7782-49-2	Selenium by ICP-MS	SOLID	LA-505-412	EU	< 1.46	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-22-4	Silver by ICP-MS	SOLID	LA-505-412		0.118	ug/g	0.49	0.097	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-28-0	Thallium by ICP-MS	SOLID	LA-505-412		0.121	ug/g	0.49	0.049	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-29-1	Thorium by ICP-MS	SOLID	LA-505-412		2.41	ug/g	0.49	0.097	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-61-1	Uranium by ICP-MS	SOLID	LA-505-412		118	ug/g	4.86	0.49	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-62-2	Vanadium by ICP-MS	SOLID	LA-505-412		104	ug/g	4.86	1.9	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-66-6	Zinc by ICP-MS	SOLID	LA-505-412		58.8	ug/g	4.86	19	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	TPH-G	Total Pet. Hydrocarbons Gas	SOLID	NWTPH	U J	< 250	ug/kg		2.5e+02	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13981-16-3	Pu-238 by AEA	SOLID	LA-508-471	U	0.0360	pCi/g		0.066	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Pu-238 by AEA Total Cntg Error	SOLID	LA-508-471		120	%		0.0	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Pu-239/240 AEA Total Cntg Err	SOLID	LA-508-471		100	%		0.0	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	PU-239/240	Pu-239/240 by AEA	SOLID	LA-508-471	U	8.90e-03	pCi/g		0.066	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	120-82-1	1,2,4-Trichlorobenzene	SOLID	LA-523-456	U	< 310	ug/kg	1.00	3.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	95-50-1	1,2-Dichlorobenzene (SV)	SOLID	LA-523-456	U	< 380	ug/kg	1.00	3.8e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	541-73-1	1,3-Dichlorobenzene	SOLID	LA-523-456	U	< 340	ug/kg	1.00	3.4e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	106-46-7	1,4-Dichlorobenzene (SV)	SOLID	LA-523-456	U	< 330	ug/kg	1.00	3.3e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	95-95-4	2,4,5-Trichlorophenol	SOLID	LA-523-456	U	< 710	ug/kg	1.00	7.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	88-06-2	2,4,6-Trichlorophenol	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	120-83-2	2,4-Dichlorophenol	SOLID	LA-523-456	U	< 85.0	ug/kg	1.00	85	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	105-67-9	2,4-Dimethylphenol	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	51-28-5	2,4-Dinitrophenol	SOLID	LA-523-456	U	< 710	ug/kg	1.00	7.1e+02	04/18/03	04/04/03	04/04/03

0000142

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2-7

Attention: Steve Trent **Group #:** WSCF20030461
Project: F03-006: 200-PW-2/PW-4

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	121-14-2	2,4-Dinitrotoluene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	606-20-2	2,6-Dinitrotoluene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-76-2	2-Butoxyethanol	SOLID	LA-523-456	U	< 110	ug/kg	1.00	1.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	91-58-7	2-Chloronaphthalene	SOLID	LA-523-456	U	< 85.0	ug/kg	1.00	85	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	95-57-8	2-Chlorophenol	SOLID	LA-523-456	U	< 160	ug/kg	1.00	1.6e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	91-57-6	2-Methylnaphthalene	SOLID	LA-523-456	U	< 190	ug/kg	1.00	1.9e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	95-48-7	2-Methylphenol	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	88-74-4	2-Nitroaniline	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	88-75-5	2-Nitrophenol	SOLID	LA-523-456	U	< 180	ug/kg	1.00	1.8e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-39-4	3 & 4 Methylphenol Total	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	91-94-1	3,3'-Dichlorobenzidine	SOLID	LA-523-456	U	< 85.0	ug/kg	1.00	85	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	99-09-2	3-Nitroaniline	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	534-52-1	4,6-Dinitro-2-methylphenol	SOLID	LA-523-456	U	< 710	ug/kg	1.00	7.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	101-55-3	4-Bromophenyl-phenylether	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	59-50-7	4-Chloro-3-methylphenol	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	106-47-8	4-Chloroaniline	SOLID	LA-523-456	U	< 99.0	ug/kg	1.00	99	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7005-72-3	4-Chlorophenyl-phenylether	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	100-01-6	4-Nitroaniline	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	100-02-7	4-Nitrophenol	SOLID	LA-523-456	U	< 690	ug/kg	1.00	6.9e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	83-32-9	Acenaphthene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	208-96-8	Acenaphthylene	SOLID	LA-523-456	U	< 85.0	ug/kg	1.00	85	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	120-12-7	Anthracene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	56-55-3	Benzo(a)anthracene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	50-32-8	Benzo(a)pyrene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	205-99-2	Benzo(b)fluoranthene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	191-24-2	Benzo(g,h,i)perylene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	207-08-9	Benzo(k)fluoranthene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03

0000043

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
E - Analyte is an estimate, has potentially larger errors
J - Estimated Value
U - Analyzed for but not detected above limiting criteria.
X - Other flags and notes described in the comments/narrative.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF
ANALYTICAL RESULTS REPORT

2 - 8

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	117-81-7	Bis (2-Ethylhexyl) phthalate	SOLID	LA-523-456	J	620	ug/kg	1.00	5.9e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-60-1	Bis(2-Chloro-1-methylene)	SOLID	LA-523-456	U	< 270	ug/kg	1.00	2.7e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	85-68-7	Butylbenzylphthalate	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	86-74-8	Carbazole	SOLID	LA-523-456	U	< 85.0	ug/kg	1.00	85	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	218-01-9	Chrysene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	84-74-2	Di-n-butylphthalate	SOLID	LA-523-456	U	< 92.0	ug/kg	1.00	92	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	117-84-0	Di-n-octylphthalate	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	53-70-3	Dibenz(a,h)anthracene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	132-64-9	Dibenzofuran	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	84-66-2	Diethylphthalate	SOLID	LA-523-456	B	1.10e+03	U ug/kg	1.00	2.0e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	131-11-3	Dimethylphthalate	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	206-44-0	Fluoranthene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	86-73-7	Fluorene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	118-74-1	Hexachlorobenzene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	87-68-3	Hexachlorobutadiene	SOLID	LA-523-456	U	< 390	ug/kg	1.00	3.9e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	77-47-4	Hexachlorocyclopentadiene	SOLID	LA-523-456	U	< 330	ug/kg	1.00	3.3e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	67-72-1	Hexachloroethane	SOLID	LA-523-456	U	< 500	ug/kg	1.00	5.0e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	193-39-5	Indeno(1,2,3-cd)pyrene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	78-59-1	Isophorone	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	621-64-7	N-Nitroso-di-n-propylamine	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	86-30-6	N-Nitrosodiphenylamine	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	91-20-3	Naphthalene	SOLID	LA-523-456	U	< 300	ug/kg	1.00	3.0e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	98-95-3	Nitrobenzene	SOLID	LA-523-456	U	< 280	ug/kg	1.00	2.8e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	87-86-5	Pentachlorophenol	SOLID	LA-523-456	U	< 320	ug/kg	1.00	3.2e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	85-01-8	Phenanthrene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-95-2	Phenol	SOLID	LA-523-456	U	< 110	ug/kg	1.00	1.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	129-00-0	Pyrene	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03

0074000

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

10/15/03

WSCF
ANALYTICAL RESULTS REPORT

2-9

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	126-73-8	Tri-n-butylphosphate	SOLID	LA-523-456	J	94.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-44-4	bis(-2-Chloroethyl)Eth	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-91-1	bis(2-Chloroethoxy)methane	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13966-29-5	U-234 by AEA	SOLID	LA-508-471		3.60	pCi/g		0.099	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-234 by AEA Total Cntg Error	SOLID	LA-508-471		22.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	15117-96-1	U-235 by AEA	SOLID	LA-508-471		0.420	pCi/g		0.093	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-235 by AEA Total Cntg Error	SOLID	LA-508-471		38.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	24678-82-8	U-238 by AEA	SOLID	LA-508-471		28.0	pCi/g		0.067	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-238 by AEA Total Cntg Error	SOLID	LA-508-471		19.0	%		0.10	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	75-35-4	1,1-Dichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-36-3	1-Butanol	SOLID	LA-523-456	U	< 21.0	ug/kg	1.00	21	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-43-2	Benzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-90-7	Chlorobenzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-88-3	Toluene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	79-01-6	Trichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	8008-20-6	Kerosene	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	68476-34-6	Total Pet. Hydrocarbons Diesel	SOLID	NWTPH	J	7.80e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	84-15-1	ortho-Terphenyl	SOLID	NWTPH		2.00e+04	ug/kg	1.00	2.1e+02	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7664-41-7	Ammonia (N) by IC	SOLID	LA-503-401		6.79	ug/g	50.00	0.20	04/23/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	57-12-5	Cyanide by Midi/Spectrophotom	SOLID	LA-695-402	U	< 0.200	mg/kg	0.99	0.20	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	TS	Percent Solids	SOLID	LA-519-412		94.1	%		0.0	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	PH	pH Soil and Waste Measurement	SOLID	LA-212-411		9.59	pH		0.010	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-46-1	Alpha by liquid scintillation	SOLID	LA-508-421		12.0	pCi/g		1.8	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Alpha error by LC	SOLID	LA-508-421		50.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-47-2	Beta by liquid scintillation	SOLID	LA-508-421		35.0	pCi/g		3.4	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Beta error by LC	SOLID	LA-508-421		31.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	540-51-2	2-Bromoethanol	SOLID	Organics		1.30e+04	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (Inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2 - 13

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ		Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	7440-29-1	Thorium by ICP-MS	SOLID	LA-505-412			2.73	ug/g	0.48	0.096	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-61-1	Uranium by ICP-MS	SOLID	LA-505-412			130	ug/g	4.79	0.48	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-62-2	Vanadium by ICP-MS	SOLID	LA-505-412			108	ug/g	4.79	1.9	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-66-6	Zinc by ICP-MS	SOLID	LA-505-412			57.3	ug/g	4.79	19	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	TPH-G	Total Pet. Hydrocarbons Gas	SOLID	NWTPH	U	J	< 250	ug/kg		2.5e+02	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13981-16-3	Pu-238 by AEA	SOLID	LA-508-471	U		0.0200	pCi/g		0.27	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Pu-238 by AEA Total Cntg Error	SOLID	LA-508-471			760	%		0.0	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Pu-239/240 AEA Total Cntg Err	SOLID	LA-508-471			120	%		0.0	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	PU-239/240	Pu-239/240 by AEA	SOLID	LA-508-471			0.0300	pCi/g		0.027	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	120-82-1	1,2,4-Trichlorobenzene	SOLID	LA-523-456	U		< 310	ug/kg	1.00	3.1e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-50-1	1,2-Dichlorobenzene (SV)	SOLID	LA-523-456	U		< 370	ug/kg	1.00	3.7e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	541-73-1	1,3-Dichlorobenzene	SOLID	LA-523-456	U		< 330	ug/kg	1.00	3.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	106-46-7	1,4-Dichlorobenzene (SV)	SOLID	LA-523-456	U		< 330	ug/kg	1.00	3.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-95-4	2,4,5-Trichlorophenol	SOLID	LA-523-456	U		< 76.0	ug/kg	1.00	76	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-06-2	2,4,6-Trichlorophenol	SOLID	LA-523-456	U		< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	120-83-2	2,4-Dichlorophenol	SOLID	LA-523-456	U		< 83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	105-67-9	2,4-Dimethylphenol	SOLID	LA-523-456	U		< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	51-28-5	2,4-Dinitrophenol	SOLID	LA-523-456	U		< 230	ug/kg	1.00	2.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	121-14-2	2,4-Dinitrotoluene	SOLID	LA-523-456	U		< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	606-20-2	2,6-Dinitrotoluene	SOLID	LA-523-456	U		< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	111-76-2	2-Butoxyethanol	SOLID	LA-523-456	U		< 100	ug/kg	1.00	1.0e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-58-7	2-Chloronaphthalene	SOLID	LA-523-456	U		< 83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-57-8	2-Chlorophenol	SOLID	LA-523-456	U		< 150	ug/kg	1.00	1.5e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-57-6	2-Methylnaphthalene	SOLID	LA-523-456	U		< 190	ug/kg	1.00	1.9e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-48-7	2-Methylphenol	SOLID	LA-523-456	U		< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-74-4	2-Nitroaniline	SOLID	LA-523-456	U		< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-75-5	2-Nitrophenol	SOLID	LA-523-456	U		< 180	ug/kg	1.00	1.8e+02	04/22/03	04/04/03	04/04/03

0060369

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.

E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	108-39-4	3 & 4 Methylphenol Total	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-94-1	3,3'-Dichlorobenzidine	SOLID	LA-523-456	U	< 83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	99-09-2	3-Nitroaniline	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	534-52-1	4,6-Dinitro-2-methylphenol	SOLID	LA-523-456	U	< 690	ug/kg	1.00	6.9e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	101-55-3	4-Bromophenyl-phenylether	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	59-50-7	4-Chloro-3-methylphenol	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	106-47-8	4-Chloroaniline	SOLID	LA-523-456	U	< 97.0	ug/kg	1.00	97	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7005-72-3	4-Chlorophenyl-phenylether	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	100-01-6	4-Nitroaniline	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	100-02-7	4-Nitrophenol	SOLID	LA-523-456	U	< 670	ug/kg	1.00	6.7e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	83-32-9	Acenaphthene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	208-96-8	Acenaphthylene	SOLID	LA-523-456	U	< 83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	120-12-7	Anthracene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	56-55-3	Benzo(a)anthracene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	50-32-8	Benzo(a)pyrene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	205-99-2	Benzo(b)fluoranthene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	191-24-2	Benzo(g,h,i)perylene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	207-08-9	Benzo(k)fluoranthene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	117-81-7	Bis (2-Ethylhexyl) phthalate	SOLID	LA-523-456	U	< 580	ug/kg	1.00	5.8e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	108-60-1	Bis(2-Chloro-1-methylene)	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	85-68-7	Butylbenzylphthalate	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	86-74-8	Carbazole	SOLID	LA-523-456	U	< 83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	218-01-9	Chrysene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	84-74-2	Di-n-butylphthalate	SOLID	LA-523-456	U	< 90.0	ug/kg	1.00	90	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	117-84-0	Di-n-octylphthalate	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	53-70-3	Dibenz(a,h)anthracene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	132-64-9	Dibenzofuran	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

10/8/03

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4
Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	84-66-2	Diethylphthalate	SOLID	LA-523-456	B	1.00e+03 U	ug/kg	1.00	1.9e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	131-11-3	Dimethylphthalate	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	206-44-0	Fluoranthene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	86-73-7	Fluorene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	118-74-1	Hexachlorobenzene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	87-68-3	Hexachlorobutadiene	SOLID	LA-523-456	U	< 380	ug/kg	1.00	3.8e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	77-47-4	Hexachlorocyclopentadiene	SOLID	LA-523-456	U	< 330	ug/kg	1.00	3.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	67-72-1	Hexachloroethane	SOLID	LA-523-456	U	< 490	ug/kg	1.00	4.9e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	193-39-5	Indeno(1,2,3-cd)pyrene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	78-59-1	Isophorone	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	621-64-7	N-Nitroso-di-n-propylamine	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	86-30-6	N-Nitrosodiphenylamine	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-20-3	Naphthalene	SOLID	LA-523-456	U	< 300	ug/kg	1.00	3.0e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	98-95-3	Nitrobenzene	SOLID	LA-523-456	U	< 270	ug/kg	1.00	2.7e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	87-86-5	Pentachlorophenol	SOLID	LA-523-456	U	< 310	ug/kg	1.00	3.1e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	85-01-8	Phenanthrene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	108-95-2	Phenol	SOLID	LA-523-456	U	< 100	ug/kg	1.00	1.0e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	129-00-0	Pyrene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	126-73-8	Tri-n-butylphosphate	SOLID	LA-523-456	J	100	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	111-44-4	bis(-2-Chloroethyl)Eth	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	111-91-1	bis(2-Chloroethoxy)methane	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13966-29-5	U-234 by AEA	SOLID	LA-508-471		5.40	pCi/g		0.095	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	U-234 by AEA Total Cntg Error	SOLID	LA-508-471		21.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	15117-96-1	U-235 by AEA	SOLID	LA-508-471		0.650	pCi/g		0.030	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	U-235 by AEA Total Cntg Error	SOLID	LA-508-471		32.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	24678-82-8	U-238 by AEA	SOLID	LA-508-471		41.0	pCi/g		0.11	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	U-238 by AEA Total Cntg Error	SOLID	LA-508-471		20.0	%		0.10	04/28/03	04/04/03	04/04/03

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF
ANALYTICAL RESULTS REPORT

2 - 16

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	75-35-4	1,1-Dichloroethene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	71-36-3	1-Butanol	SOLID	LA-523-455	U	< 20.0	ug/kg	1.00	20	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	71-43-2	Benzene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	108-90-7	Chlorobenzene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	108-88-3	Toluene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	79-01-6	Trichloroethene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	8008-20-6	Kerosene	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	68476-34-6	Total Pet. Hydrocarbons Diesel	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	84-15-1	ortho-Terphenyl	SOLID	NWTPH	~~U~~ J	2.20e+04	ug/kg	1.00	2.1e+02	05/01/03	04/04/03	04/04/03

DFagnes
5/16/04
per e-mail

0000184

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
E - Analyte is an estimate, has potentially larger errors
J - Estimated Value
U - Analyzed for but not detected above limiting criteria.
X - Other flags and notes described in the comments/narrative.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Sample Delivery Group	**WSCF20030461**
Sample Matrix	**Soil**
Sample Visual	**Brown**
SAF Number	**F03-006**
Data Deliverable	**Summary Report**

Introduction

Two (2) soil samples (B16RX8, B16RX9) from the GPP was received at the WSCF Laboratory on April 4, 2003. The sample was analyzed for those analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Groundwater Protection Program- Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information. Copies of the chain of custody and Request for Sample Analysis forms are included as Attachment 3.

Analytical Methodology for Requested Analyses

- ICP-MS Metals by EPA Method 200.8 and ICP-AES Metals by EPA SW-846 Method 6010A. Analytical work was performed with no deviations to the approved method.
- VOA's by EPA SW-846 Method 8260A. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under EPA SW-846 Method 8015 was reported under this method.
- Semi-VOA's by EPA SW-846 Method 8270B. Analytical work was performed with no deviations to the approved method.
- Alcohols and Glycols by EPA SW-846 Method 8015. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under this method was reported under EPA SW-846 Method 8260A.
- WTPH-D by WDOE Method NWTPH-Dx. Analytical work was performed with no deviations to the approved method.
- WTPH-G by WDOE Method NWTPH-Gx. Analytical work was performed with no deviations to the approved method.

- IC Anions and Ammonium by EPA SW-846 Method 300.0 and 300.7. Analytical work was performed with no deviations to the approved method for Ammonium, but a deviation was required for the Anions (see comments below).

- The pH by EPA Method 150.1. Analytical work was performed with no deviations to the approved method.

- Percent Solids by EPA Method 160.3. Analytical work was performed with no deviations to the approved method.

- Cyanide by EPA SW-846 Method 9010. Analytical work was performed with no deviations to the approved method.

- All RadChem analyses (TA/TB, AEA's, GEA) were run by internal WDOE accredited WSCF procedures. Analytical work was performed with no deviations to the approved method.

Comments

PCB's – This analysis was originally on the Sample Chain of Custody when received at the WSCF Laboratory, but the client later requested the analysis not be run.

ICP-MS and ICP-AES Metals – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-27, 2-28, 2-29, 2-30, and 2-48 for QC details.

VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-36, 2-37 and 2-38 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Semi-VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-44, 2-45, 2-46 and 2-47 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Alcohols and Glycols – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-37 for QC details.

WTPH-D – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-40 for details.

WTPH-G – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-39 for details.

IC Anions – The client requested hold time(s) for this analysis was not met. The client was notified and requested WSCF to continue with this analysis. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-33, 2-34 and 2-36 for QC details.

NH4 – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-38 for QC details.

The pH – Per the direction of the chain of custody, the pH was completed within 24 hours of sampling.

Percent Solids – PCB's, VOA's, Semi-VOA's, Alcohols and Glycols, WTPH-G and WTPH-D analytical results were corrected for percent solids. All other analytical results were reported for the sample as received.

CN – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-26 for QC details.

RadChem – There are no hold times associated with these WDOE accredited methods. Except for GEA, a Laboratory Control Sample and Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-31, 2-32, and 2-35 for QC details.

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.

Troy Dale
WSCF Production Control

Abbreviations

Hg – mercury
IC – ion chromatography
ICP – inductively coupled plasma
ICP/AES – ICP/atomic emission spectroscopy
ICP/MS – ICP/mass spectrometry
Total U – total uranium
AT/TB – total alpha/total beta
AEA – Alpha Energy Analysis
WTPH-G – Total Hydrocarbons-Gasoline
Am – americium
Cm - curium
Pu – plutonium
Np – neptunium
GEA – gamma energy analysis
H3 – Tritium
Sr – Strontium 89, 90
WTPH-D – Total Hydrocarbons-Diesel
TSS – Total Suspended Solids

5/5/03

3-3

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-014	Page 1 of 1
Collector Johansen/Pope/Pfister	Company Contact LC Hulstrom	Telephone No. 373-3928	Project Coordinator TRENT, SJ	Price Code 8N Air Quality ☐
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location 216-A-19 (C3245) 22.5-25.0 ft		SAF No. F03-006	Data Turnaround 30 Days
Ice Chest No. SMC-69	Field Logbook No. HNF-N-3361	COA 117504ES10	Method of Shipment Government Vehicle	
Shipped To Waste Sampling & Characterization	Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

C00023

SAMPLE ANALYSIS

20030461

	Preservation	Cool 4C	Cool 4C	None	None						
	Type of Container	aG	Gs*	P	Snap Vial						
	No. of Container(s)	1	3	1	1						
	Volume	250mL	40mL	500mL	60mL						
		See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Activity Scan						
Sample No.	Matrix *	Sample Date	Sample Time								
B16RX8 W030020159	SOIL	4-4-03	1348	X	X	X	X				
B16RX9 W030020160	SOIL	4-4-03	1348	X	X	X	X				

CHAIN OF POSSESSION	Sign/Print Names			
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
[illegible]	4/4/03 1450	[illegible]	4/4/03 1450	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	

SPECIAL INSTRUCTIONS

** The laboratory is to report both kerosene and diesel range compounds from the WTPH-D analysis.

(1) Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G; PCBs - 8082
(2) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(3) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134, Tin-126}; Isotopic Radium {Radium-226, Radium-228}; Isotopic Plutonium; Americium-241; Isotopic Uranium; Trace Elements ICP/MS - 200.8 (Complete) {Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Uranium}; ICP Metals - 6010A (Add-on) {Bismuth, Boron}; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; Cyanide (Total) - 335.2; Cations (IC) - 300.7 {Nitrogen in ammonium}; pH (Soil) - 9045

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-PW-2/200-PW-4			DATA PACKAGE: WSCF200304G1		
VALIDATOR: TL		LAB: WSCF		DATE: 10/18/03	
CASE:			SDG: 30461		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
				8015	
SAMPLES/MATRIX					
B16RX8 B16RX9					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

Continuing calibrations acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments: diethylphthalate in Blank – U both
~~ortho-terphenyl~~ U ~~both~~ 5/8/01

No FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	~~Yes~~ (No) N/A
Surrogate/system monitoring compound recoveries acceptable?	(Yes) No N/A
Surrogates traceable? (Levels D, E)	Yes No (N/A)
Surrogates expired? (Levels D, E)	Yes No (N/A)
MS/MSD samples analyzed? yes	~~Yes No~~ N/A
MS/MSD results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards? (Levels D, E)	Yes No (N/A)
LCS/BSS samples analyzed? (yes)	~~Yes No~~ N/A
LCS/BSS results acceptable?	(Yes) No N/A
Standards traceable? (Levels D, E)	Yes No (N/A)
Standards expired? (Levels D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes (No) N/A
Performance audit sample results acceptable?	Yes No (N/A)

Comments: No 8015 surrogate – J TPH-G No PAS
~~No Kerosene MS/MSD – J all~~ 12/4/?
~~No Diesel LCS – J all~~

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD RPD values acceptable? ..... (Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
Field duplicate RPD values acceptable? ..... Yes No (N/A)
Field split RPD values acceptable? ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: _____

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No (N/A)
Iinternal standard areas acceptable? ..... Yes No (N/A)
Internal standard retention times acceptable? ..... Yes No (N/A)
Standards traceable? ..... Yes No (N/A)
Standards expired? ..... Yes No (N/A)
Transcription/calculation errors? ..... Yes No (N/A)
Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A
Sample holding times acceptable? ..... (Yes) No N/A
Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes	No	N/A
Compound quantitation acceptable? (Levels D, E)	Yes	No	N/A
Results reported for all requested analyses?	Yes	No	N/A
Rresults supported in the raw data? (Levels D, E)	Yes	No	N/A
Samples properly prepared? (Levels D, E)	Yes	No	N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments:

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries aceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:

Appendix 6

Additional Documentation Requested by Client

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: SW-846 8270B Semi-Vols

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

Lab ID: W030000159
BATCH QC ASSOCIATED WITH SAMPLE

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
MS	1,2,4-Trichlorobenzene	120-82-1	93.400	% Recov	04/18/03	46.000	107.000
MS	1,4-Dichlorobenzene (SV)	106-46-7	78.900	% Recov	04/18/03	30.000	96.000
MS	2,4-Dinitrotoluene	121-14-2	74.600	% Recov	04/18/03	59.000	106.000
MS	2-Fluorophenol Surr	367-12-4	79.700	%Recove	04/18/03	42.000	105.000
MS	Acenaphthene	83-32-9	86.900	% Recov	04/18/03	61.000	116.000
MS	4-Chloro-3-methylphenol	59-50-7	93.200	% Recov	04/18/03	61.000	106.000
MS	2-Chlorophenol	95-57-8	74.500	% Recov	04/18/03	66.000	106.000
MS	N-Nitroso-di-n-propylamine	621-64-7	84.900	% Recov	04/18/03	71.000	114.000
MS	2-Fluorobiphenyl Surr	321-60-8	88.700	%Recove	04/18/03	56.000	122.000
MS	Phenol	108-95-2	70.900	% Recov	04/18/03	42.000	111.000
MS	Nitrobenzene-d5 Surr	4165-60-0	89.400	%Recove	04/18/03	64.000	111.000
MS	4-Nitrophenol	100-02-7	78.200	% Recov	04/18/03	32.000	118.000
MS	Pentachlorophenol	87-86-5	85.900	% Recov	04/18/03	62.000	114.000
MS	Phenol-d5 Surr	4165-62-2	78.000	%Recove	04/18/03	54.000	120.000
MS	Pyrene	129-00-0	91.100	% Recov	04/18/03	66.000	118.000
MS	2,4,6-Tribromophenol Surr	118-79-6	105.000	%Recove	04/18/03	24.000	122.000
MS	Terphenyl-d14 Surr	98904-43-9	96.400	%Recove	04/18/03	35.000	150.000
MSD	1,2,4-Trichlorobenzene	120-82-1	92.400	% Recov	04/18/03	46.000	107.000
MSD	1,4-Dichlorobenzene (SV)	106-46-7	81.700	% Recov	04/18/03	30.000	96.000
MSD	2,4-Dinitrotoluene	121-14-2	75.700	% Recov	04/18/03	59.000	106.000
MSD	2-Fluorophenol Surr	367-12-4	73.700	%Recove	04/18/03	42.000	105.000
MSD	Acenaphthene	83-32-9	85.800	% Recov	04/18/03	61.000	116.000
MSD	4-Chloro-3-methylphenol	59-50-7	88.100	% Recov	04/18/03	61.000	106.000
MSD	2-Chlorophenol	95-57-8	73.100	% Recov	04/18/03	66.000	106.000
MSD	N-Nitroso-di-n-propylamine	621-64-7	84.400	% Recov	04/18/03	71.000	114.000
MSD	2-Fluorobiphenyl Surr	321-60-8	87.300	%Recove	04/18/03	56.000	122.000
MSD	Phenol	108-95-2	70.800	% Recov	04/18/03	42.000	111.000
MSD	Nitrobenzene-d5 Surr	4165-60-0	85.200	%Recove	04/18/03	64.000	111.000
MSD	4-Nitrophenol	100-02-7	78.700	% Recov	04/18/03	32.000	118.000
MSD	Pentachlorophenol	87-86-5	88.300	% Recov	04/18/03	62.000	114.000
MSD	Phenol-d5 Surr	4165-62-2	80.800	%Recove	04/18/03	54.000	120.000
MSD	Pyrene	129-00-0	87.600	% Recov	04/18/03	66.000	118.000
MSD	2,4,6-Tribromophenol Surr	118-79-6	102.000	%Recove	04/18/03	24.000	122.000
MSD	Terphenyl-d14 Surr	98904-43-9	92.100	%Recove	04/18/03	35.000	150.000
SPK-RPD	1,2,4-Trichlorobenzene	120-82-1	1.076	RPD	04/18/03	0.000	20.000
SPK-RPD	1,4-Dichlorobenzene (SV)	106-46-7	3.487	RPD	04/18/03	0.000	20.000
SPK-RPD	2,4-Dinitrotoluene	121-14-2	1.464	RPD	04/18/03	0.000	20.000
SPK-RPD	2-Fluorophenol Surr	367-12-4	92.472	%Recove	04/18/03	42.000	105.000
SPK-RPD	Acenaphthene	83-32-9	1.274	RPD	04/18/03	0.000	20.000
SPK-RPD	4-Chloro-3-methylphenol	59-50-7	5.626	RPD	04/18/03	0.000	20.000
SPK-RPD	2-Chlorophenol	95-57-8	1.897	RPD	04/18/03	0.000	20.000
SPK-RPD	N-Nitroso-di-n-propylamine	621-64-7	0.591	RPD	04/18/03	0.000	20.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: SW-846 8270B Semi-Vols

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte		CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
SPK-RPD	2-Fluorobiphenyl	Surr	321-60-8	98.422	%Recove	04/18/03	56.000	122.000
SPK-RPD	Phenol		108-95-2	0.141	RPD	04/18/03	0.000	20.000
SPK-RPD	Nitrobenzene-d5	Surr	4165-60-0	95.302	%Recove	04/18/03	64.000	111.000
SPK-RPD	4-Nitrophenol		100-02-7	0.637	RPD	04/18/03	0.000	20.000
SPK-RPD	Pentachlorophenol		87-86-5	2.765	RPD	04/18/03	0.000	20.000
SPK-RPD	Phenol-d5	Surr	4165-62-2	103.590	%Recove	04/18/03	54.000	120.000
SPK-RPD	Pyrene		129-00-0	3.917	RPD	04/18/03	0.000	20.000
SPK-RPD	2,4,6-Tribromophenol	Surr	118-79-6	97.143	%Recove	04/18/03	24.000	122.000
SPK-RPD	Terphenyl-d14	Surr	98904-43-9	95.539	%Recove	04/18/03	35.000	150.000
SURR	2-Fluorophenol	Surr	367-12-4	73.100	%Recove	04/18/03	42.000	105.000
SURR	2-Fluorobiphenyl	Surr	321-60-8	98.700	%Recove	04/18/03	56.000	122.000
SURR	Nitrobenzene-d5	Surr	4165-60-0	85.500	%Recove	04/18/03	64.000	111.000
SURR	Phenol-d5	Surr	4165-62-2	80.000	%Recove	04/18/03	54.000	120.000
SURR	2,4,6-Tribromophenol	Surr	118-79-6	85.600	%Recove	04/18/03	24.000	122.000
SURR	Terphenyl-d14	Surr	98904-43-9	96.000	%Recove	04/18/03	35.000	150.000

Lab ID: W030000160
BATCH QC ASSOCIATED WITH SAMPLE

SURR	2-Fluorophenol	Surr	367-12-4	82.700	%Recove	04/22/03	42.000	105.000
SURR	2-Fluorobiphenyl	Surr	321-60-8	98.000	%Recove	04/22/03	56.000	122.000
SURR	Nitrobenzene-d5	Surr	4165-60-0	91.900	%Recove	04/22/03	64.000	111.000
SURR	Phenol-d5	Surr	4165-62-2	85.700	%Recove	04/22/03	54.000	120.000
SURR	2,4,6-Tribromophenol	Surr	118-79-6	85.700	%Recove	04/22/03	24.000	122.000
SURR	Terphenyl-d14	Surr	98904-43-9	104.000	%Recove	04/22/03	35.000	150.000

BATCH QC

BLANK	1,2-Dichlorobenzene (SV)		95-50-1	< 360	ug/Kg	04/18/03		
BLANK	1,2,4-Trichlorobenzene		120-82-1	< 290	ug/Kg	04/18/03		
BLANK	1,3-Dichlorobenzene		541-73-1	< 320	ug/Kg	04/18/03		
BLANK	1,4-Dichlorobenzene (SV)		106-46-7	< 310	ug/Kg	04/18/03		
BLANK	2,4-Dichlorophenol		120-83-2	< 80	ug/Kg	04/18/03		
BLANK	2,4-Dinitrotoluene		121-14-2	< 67	ug/Kg	04/18/03		
BLANK	2,4,5-Trichlorophenol		95-95-4	< 670	ug/Kg	04/18/03		
BLANK	2,4,6-Trichlorophenol		88-06-2	< 67	ug/Kg	04/18/03		
BLANK	2,4-Dimethylphenol		105-67-9	< 67	ug/Kg	04/18/03		
BLANK	2,6-Dinitrotoluene		606-20-2	< 67	ug/Kg	04/18/03		
BLANK	2-Butoxyethanol		111-76-2	< 100	ug/Kg	04/18/03		
BLANK	2-Chloronaphthalene		91-58-7	< 80	ug/Kg	04/18/03		
BLANK	2-Fluorophenol	Surr	367-12-4	67.900	%Recove	04/18/03	42.000	105.000
BLANK	2-Methylnaphthalene		91-57-6	< 180	ug/Kg	04/18/03		
BLANK	2-Methylphenol		95-48-7	< 67	ug/Kg	04/18/03		
BLANK	2-Nitroaniline		88-74-4	< 67	ug/Kg	04/18/03		
BLANK	2-Nitrophenol		88-75-5	< 170	ug/Kg	04/18/03		
BLANK	3 & 4 Methylphenol Total		108-39-4	< 110	ug/Kg	04/18/03	0.000	300.000
BLANK	3-Nitroaniline		99-09-2	< 67	ug/Kg	04/18/03		
BLANK	4,6-Dinitro-2-methylphenol		534-52-1	< 670	ug/Kg	04/18/03		

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: SW-846 8270B Semi-Vols

SAF Number: F03-006
Sample Date:
Receive Date:

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
BLANK	4-Bromophenyl-phenylether	101-55-3	< 67	ug/Kg	04/18/03		
BLANK	4-Chlorophenyl-phenylether	7005-72-3	< 67	ug/Kg	04/18/03		
BLANK	Acenaphthene	83-32-9	< 67	ug/Kg	04/18/03		
BLANK	Acenaphthylene	208-96-8	< 80	ug/Kg	04/18/03		
BLANK	Anthracene	120-12-7	< 67	ug/Kg	04/18/03		
BLANK	bis(-2-Chloroethyl)Eth	111-44-4	< 250	ug/Kg	04/18/03		
BLANK	Benzo(a)anthracene	56-55-3	< 67	ug/Kg	04/18/03		
BLANK	Benzo(b)fluoranthene	205-99-2	< 67	ug/Kg	04/18/03		
BLANK	Benzo(g,h,i)perylene	191-24-2	< 67	ug/Kg	04/18/03		
BLANK	Benzo(a)pyrene	50-32-8	< 67	ug/Kg	04/18/03		
BLANK	bis(2-Chloroethoxy)methane	111-91-1	< 110	ug/Kg	04/18/03		
BLANK	Bis (2-Ethylhexyl) phthalate	117-81-7	< 560	ug/Kg	04/18/03		
BLANK	Bis(2-Chloro-1-methylene)	108-60-1	< 250	ug/Kg	04/18/03	0.000	10.000
BLANK	Benzo(k)fluoranthene	207-08-9	< 67	ug/Kg	04/18/03		
BLANK	Butylbenzylphthalate	85-68-7	< 67	ug/Kg	04/18/03		
BLANK	Carbazole	86-74-8	< 80	ug/Kg	04/18/03		
BLANK	4-Chloroaniline	106-47-8	< 93	ug/Kg	04/18/03		
BLANK	4-Chloro-3-methylphenol	59-50-7	< 67	ug/Kg	04/18/03		
BLANK	2-Chlorophenol	95-57-8	< 150	ug/Kg	04/18/03		
BLANK	Chrysene	218-01-9	< 67	ug/Kg	04/18/03		
BLANK	3,3'-Dichlorobenzidine	91-94-1	< 80	ug/Kg	04/18/03		
BLANK	Dibenz(a,h)anthracene	53-70-3	< 67	ug/Kg	04/18/03		
BLANK	Dibenzofuran	132-64-9	< 67	ug/Kg	04/18/03		
BLANK	Di-n-butylphthalate	84-74-2	< 87	ug/Kg	04/18/03		
BLANK	Diethylphthalate	84-66-2	570	ug/Kg	04/18/03		
BLANK	Dimethylphthalate	131-11-3	< 67	ug/Kg	04/18/03		
BLANK	2,4-Dinitrophenol	51-28-5	< 670	ug/Kg	04/18/03		
BLANK	Di-n-octylphthalate	117-84-0	< 67	ug/Kg	04/18/03		
BLANK	N-Nitroso-di-n-propylamine	621-64-7	< 67	ug/Kg	04/18/03		
BLANK	2-Fluorobiphenyl Surr	321-60-8	85.100	%Recove	04/18/03	56.000	122.000
BLANK	Fluorene	86-73-7	< 67	ug/Kg	04/18/03		
BLANK	Fluoranthene	206-44-0	< 67	ug/Kg	04/18/03		
BLANK	Hexachlorobenzene	118-74-1	< 67	ug/Kg	04/18/03		
BLANK	Hexachlorobutadiene	87-68-3	< 370	ug/Kg	04/18/03		
BLANK	Hexachlorocyclopentadiene	77-47-4	< 310	ug/Kg	04/18/03		
BLANK	Hexachloroethane	67-72-1	< 470	ug/Kg	04/18/03		
BLANK	Indeno(1,2,3-cd)pyrene	193-39-5	< 67	ug/Kg	04/18/03		
BLANK	Isophorone	78-59-1	< 67	ug/Kg	04/18/03		
BLANK	Phenol	108-95-2	< 100	ug/Kg	04/18/03		
BLANK	Naphthalene	91-20-3	< 290	ug/Kg	04/18/03		
BLANK	Nitrobenzene-d5 Surr	4165-60-0	86.000	%Recove	04/18/03	64.000	111.000
BLANK	Nitrobenzene	98-95-3	< 260	ug/Kg	04/18/03		
BLANK	4-Nitrophenol	100-02-7	< 650	ug/Kg	04/18/03		
BLANK	4-Nitroaniline	100-01-6	< 250	ug/Kg	04/18/03		
BLANK	N-Nitrosodiphenylamine	86-30-6	< 67	ug/Kg	04/18/03		
BLANK	Pentachlorophenol	87-86-5	< 300	ug/Kg	04/18/03		

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: SW-846 8270B Semi-Vols

SAF Number: F03-006
Sample Date:
Receive Date:

QC Type	Analyte		CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
BLANK	Phenanthrene		85-01-8	< 67	ug/Kg	04/18/03		
BLANK	Phenol-d5	Surr	4165-62-2	77.300	%Recove	04/18/03	54.000	120.000
BLANK	Pyrene		129-00-0	< 67	ug/Kg	04/18/03		
BLANK	Tri-n-butylphosphate		126-73-8	< 67	ug/Kg	04/18/03		
BLANK	2,4,6-Tribromophenol	Surr	118-79-6	66.800	%Recove	04/18/03	24.000	122.000
BLANK	Terphenyl-d14	Surr	98904-43-9	97.400	%Recove	04/18/03	35.000	150.000
LCS	1,2,4-Trichlorobenzene		120-82-1	88.300	% Recov	04/18/03	46.000	107.000
LCS	1,4-Dichlorobenzene (SV)		106-46-7	78.800	% Recov	04/18/03	42.000	111.000
LCS	2,4-Dinitrotoluene		121-14-2	72.000	% Recov	04/18/03	59.000	106.000
LCS	2-Fluorophenol	Surr	367-12-4	75.300	% Recov	04/18/03	50.000	110.000
LCS	Acenaphthene		83-32-9	80.800	% Recov	04/18/03	61.000	116.000
LCS	4-Chloro-3-methylphenol		59-50-7	83.000	% Recov	04/18/03	61.000	106.000
LCS	2-Chlorophenol		95-57-8	72.600	% Recov	04/18/03	66.000	106.000
LCS	N-Nitroso-di-n-propylamine		621-64-7	77.200	% Recov	04/18/03	71.000	114.000
LCS	2-Fluorobiphenyl	Surr	321-60-8	83.700	% Recov	04/18/03	59.000	109.000
LCS	Phenol		108-95-2	73.900	% Recov	04/18/03	67.000	105.000
LCS	Nitrobenzene-d5	Surr	4165-60-0	81.900	% Recov	04/18/03	60.000	118.000
LCS	4-Nitrophenol		100-02-7	64.400	% Recov	04/18/03	32.000	118.000
LCS	Pentachlorophenol		87-86-5	72.500	% Recov	04/18/03	62.000	114.000
LCS	Phenol-d5	Surr	4165-62-2	77.200	% Recov	04/18/03	59.000	116.000
LCS	Pyrene		129-00-0	86.400	% Recov	04/18/03	66.000	118.000
LCS	2,4,6-Tribromophenol	Surr	118-79-6	81.500	% Recov	04/18/03	60.000	120.000
LCS	Terphenyl-d14	Surr	98904-43-9	91.100	% Recov	04/18/03	60.000	120.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: WTPH-D TPH Diesel Range (Wa)

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	ortho-Terphenyl	84-15-1	100.000	% Recov	05/01/03	70.000	130.000
MS	Total Pet. Hydrocarbons Diesel	68476-34-6	86.500	% Recov	05/01/03	75.000	125.000
MSD	ortho-Terphenyl	84-15-1	97.100	% Recov	05/01/03	70.000	130.000
MSD	Total Pet. Hydrocarbons Diesel	68476-34-6	88.000	% Recov	05/01/03	75.000	125.000
SPK-RPD	ortho-Terphenyl	84-15-1	2.943	RPD	05/06/03	0.000	20.000
SPK-RPD	Total Pet. Hydrocarbons Diesel	68476-34-6	1.719	RPD	05/06/03	0.000	20.000
BATCH QC							
BLANK	Kerosene	8008-20-6	< 4000	ug/Kg	05/01/03	0.000	100.000
BLANK	ortho-Terphenyl	84-15-1	22743	ug/Kg	05/01/03	70.000	130.000
BLANK	Total Pet. Hydrocarbons Diesel	68476-34-6	< 4000	ug/Kg	05/01/03	0.000	300.000
LCS	Kerosene	8008-20-6	85.000	%Recove	05/01/03	70.000	130.000
LCS	ortho-Terphenyl	84-15-1	99.700	% Recov	05/01/03	70.000	130.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: NWTPH-GX TPH Gasoline Range

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000157							
BATCH QC ASSOCIATED WITH SAMPLE							
DUP	Total Pet. Hydrocarbons Gas	TPH-G	n/a	RPD	04/16/03	0.000	20.000
MS	Total Pet. Hydrocarbons Gas	TPH-G	97.000	% Recov	04/16/03	50.000	150.000
MSD	Total Pet. Hydrocarbons Gas	TPH-G	98.000	% Recov	04/16/03	50.000	150.000
SPK-RPD	Total Pet. Hydrocarbons Gas	TPH-G	1.026	RPD	04/16/03	0.000	20.000
Lab ID: W030000158							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Total Pet. Hydrocarbons Gas	TPH-G	87.000	% Recov	04/16/03	50.000	150.000
MSD	Total Pet. Hydrocarbons Gas	TPH-G	106.000	% Recov	04/16/03	50.000	150.000
SPK-RPD	Total Pet. Hydrocarbons Gas	TPH-G	19.689	RPD	04/16/03	0.000	20.000
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Total Pet. Hydrocarbons Gas	TPH-G	101.000	% Recov	04/16/03	50.000	150.000
MSD	Total Pet. Hydrocarbons Gas	TPH-G	103.000	% Recov	04/16/03	50.000	150.000
SPK-RPD	Total Pet. Hydrocarbons Gas	TPH-G	1.961	RPD	04/16/03	0.000	20.000
BATCH QC							
BLANK	Total Pet. Hydrocarbons Gas	TPH-G	<50	mg/L	04/16/03	0.000	300.000
LCS	Total Pet. Hydrocarbons Gas	TPH-G	89.000	% Recov	04/16/03	85.000	115.000

Ayres, Doris E

From: Christian, Bruce [BChristian@TechLawInc.com]
Sent: Thursday, August 05, 2004 5:59 PM
To: Ayres, Doris E
Subject: RE: Validation Issues

This is my permission to cross off the UJ qualifiers on the ortho-terphenyl.

-----Original Message-----
From: Ayres, Doris E [mailto:Doris_E_Ayres@RL.gov]
Sent: Wed 7/21/2004 3:57 PM
To: Christian, Bruce
Cc: Trent, Stephen J
Subject: Validation Issues

Bruce -

Per our phone conversation of July 21, 2004, the following items need your attention:

1. Review Comment #1 and #3 from Bill Thackaberry on H2469 need to be amended. The associated pages also need to be corrected and resubmitted.
2. Review Comment #1, #3, #5, and #6 from Bill Thackaberry on WSCF200431684 need to be amended. The associated pages also need to be corrected and resubmitted.
3. On the validation for some WSCF data for the 200-PW-2 validation that was done in January, I need a letter/memo giving me permission to cross off the "UJ" qualifiers that were added to the ortho-Terphenyl (CAS # 84-15-1).

Doris

Date: 17 November 2003
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-PW-2/200-PW-4 OU Borehole Soil Sampling
Subject: Inorganics - Data Package No. WSCF20030461 (SDG No. 30461)

INTRODUCTION

This memo presents the results of data validation on Data Package No. 30461 prepared by WSCF. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16RX8	4/4/03	Soil	C	See note 1
B16RX9	4/4/03	Soil	C	See note 1

1 - ICP metals by 6010A and 200.8.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & Matrix Spike Duplicate

Matrix spike (MS), matrix spike duplicate (MSD) are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 75% to 125% for matrix spike analysis. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 74% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required. LCS recoveries must fall within limits specified by the laboratory.

Due to MS or MSD recoveries outside QC limits, all arsenic (MS-55.97%, MSD 65.1%), molybdenum (MS-56.93%, MSD-57.6%) and selenium (MS-50%, MSD-52.3%) results were qualified as estimates and flagged "J".

Due to the lack of a MS/MSD analysis, all aluminum, barium, manganese, uranium, vanadium and zinc results were qualified as estimates and flagged "J".

All other MS/MSD results were acceptable.

Laboratory Control Sample

The LCS is used to monitor the overall performance of all steps in the analysis. Recoveries must fall within the range of 80% to 120% for LCS analysis. Samples with a recovery of less than 50% are rejected and flagged "UR". Samples with a recovery of 50% to 79% and a sample recovery below the IDL are qualified "UJ". Samples with a recovery of greater than 120% or less than 80% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 120% and a sample result less than the IDL, no qualification is required.

Due to an LCS recovery outside QC limits (147.8%), the silver result in sample B16RX8 was qualified as an estimate and flagged "J".

Due to the lack of an LCS analysis, all thorium results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (217.1%), all boron results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike and matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than +/- 35%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to the lack of a MS/MSD analysis, all aluminum, barium, manganese, uranium, vanadium and zinc results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Limits**

Reported analytical detection levels are compared against the target quantitation limits (TQLs) to ensure that laboratory detection levels meet the required criteria. All undetected results met the analyte specific TQL.

- **Completeness**

Data package No. 30461 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to MS or MSD recoveries outside QC limits, all arsenic (MS-55.97%, MSD 65.1%), molybdenum (MS-56.93%, MSD-57.6%) and selenium (MS-50%, MSD-52.3%) results were qualified as estimates and flagged "J". Due to the lack of a MS/MSD analysis, all aluminum, barium, manganese, uranium, vanadium and zinc results were qualified as estimates and flagged "J". Due to an LCS recovery outside QC limits (147.8%), the silver result in sample B16RX8 was qualified as an estimate and flagged "J". Due to the lack of an LCS analysis, all thorium results were qualified as estimates and flagged "J". Due to an LCS recovery outside QC limits (217.1%), all boron results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with FHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: 30461	REVIEWER: TLI	DATE: 11/17/03	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Arsenic, molybdenum, selenium	J	All	MS/MSD recovery
Aluminum, barium, manganese, uranium, vanadium, zinc	J	All	No MS/MSD analysis
Boron	J	All	LCS recovery
Silver	J	B16RX8	LCS recovery
Thorium	J	All	No LCS analysis

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: FLUOR HANFORD									
Laboratory: WSCF									
Case	SDG: WSCF20030461								
Sample Number		B16RX8		B16RX9					
Remarks									
Sample Date		4/4/03		4/4/03					
Inorganics	TQL	Result	Q	Result	Q	Result	Q	Result	Q
Bismith		<6.62	U	<6.11	U				
Boron		34.33	J	34.10	J				
Aluminum		6970	J	6520	J				
Antimony	6	<0.243	U	<0.240	U				
Arsenic	1	2.81	J	2.07	J				
Barium	20	83.7	J	85.8	J				
Beryllium	0.5	0.248		0.256					
Cadmium	0.5	0.200		0.208					
Chromium	1	4.84		4.91					
Cobalt		9.81		10.5					
Copper	2.5	12.9		13.0					
Lead	1	2.80		2.78					
Manganese		433	J	456	J				
Mercury	0.2	<0.0486	U	<0.0479	U				
Molybdenum		1.54	J	<1.44	UJ				
Nickel	4	6.25		6.90					
Selenium	10	<1.46	UJ	<1.44	UJ				
Silver	0.5	0.118	J	<0.0958	U				
Thallium		0.121		0.103					
Thorium		2.41	J	2.73	J				
Uranium	1	118	J	130	J				
Vanadium		104	J	108	J				
Zinc		58.8	J	57.3	J				

000040

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent **Group #:** WSCF20030461
Project: F03-006: 200-PW-2/PW-4

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	13968-53-1	Ru-103 by GEA	SOLID	LA-508-462	U	6.11e-04	pCi/g		0.012	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Ru-106 Rel.% Count Error (GEA)	SOLID	LA-508-462		1.00e+03	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13967-48-1	Ru-106 by GEA	SOLID	LA-508-462	U	6.81e-04	pCi/g		0.10	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Sb-125 Rel.% Count Error (GEA)	SOLID	LA-508-462		330	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14234-35-6	Sb-125 by GEA	SOLID	LA-508-462	U	6.10e-03	pCi/g		0.033	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Sn-113 Rel.% Count Error (GEA)	SOLID	LA-508-462		192	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13966-06-8	Sn-113 by GEA	SOLID	LA-508-462	U	4.95e-03	pCi/g		0.015	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Sn-126 Rel.% Count Error (GEA)	SOLID	LA-508-462		19.2	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	15832-50-5	Sn-126 by GEA	SOLID	LA-508-462	U	0.578	pCi/g		0.085	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Th-234 Rel.% Count Error (GEA)	SOLID	LA-508-462		14.4	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	15065-10-8	Th-234 by GEA	SOLID	LA-508-462		25.4	pCi/g		1.5	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Tl-208 Rel.% Count Error (GEA)	SOLID	LA-508-462		15.8	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14913-50-9	Tl-208 by GEA	SOLID	LA-508-462		0.147	pCi/g		0.012	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-235 Rel.% Count Error (GEA)	SOLID	LA-508-462		41.0	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	15117-96-1	U-235 by GEA	SOLID	LA-508-462		0.316	pCi/g		0.13	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Zn-65 Rel.% Count Error (GEA)	SOLID	LA-508-462		178	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13982-39-3	Zn-65 by GEA	SOLID	LA-508-462	U	9.03e-03	pCi/g		0.024	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-69-9	Bismuth by ICP	SOLID	LA-505-411	U	< 6.62	ug/L	1.00	6.6	05/06/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	~~7440-50-8~~ 7440-42-8	Boron by ICP	SOLID	LA-505-411	E J	34.33	ug/g	97.00	9.890	05/06/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7429-90-5	Aluminum by ICP-MS	SOLID	LA-505-412	E J	6.97e+03	ug/g	4.86	54	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-36-0	Antimony by ICP-MS	SOLID	LA-505-412	U	< 0.243	ug/g	0.49	0.24	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-38-2	Arsenic by ICP-MS	SOLID	LA-505-412	E J	2.81	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-39-3	Barium by ICP-MS	SOLID	LA-505-412	J	83.7	ug/g	4.86	0.97	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-41-7	Beryllium by ICP-MS	SOLID	LA-505-412		0.248	ug/g	0.49	0.15	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-43-9	Cadmium by ICP-MS	SOLID	LA-505-412		0.200	ug/g	0.49	0.049	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-47-3	Chromium by ICP-MS	SOLID	LA-505-412		4.84	ug/g	0.49	0.15	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-48-4	Cobalt by ICP-MS	SOLID	LA-505-412		9.81	ug/g	0.49	0.097	04/15/03	04/04/03	04/04/03

Dwyer 8/16/04

MDL=Minimum Detection Limit
RQ=Result Qualifier
DF=Dilution Factor

B - The analyte < the RDL but >= the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

10/18/05

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2-6

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4
Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ		Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	7440-50-8	Copper by ICP-MS	SOLID	LA-505-412			12.9	ug/g	0.49	0.24	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-92-1	Lead by ICP-MS	SOLID	LA-505-412			2.80	ug/g	0.49	0.58	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-96-5	Manganese by ICP-MS	SOLID	LA-505-412	J		433	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-97-6	Mercury by ICP-MS	SOLID	LA-505-412	U	<	0.0486	ug/g	0.49	0.049	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-98-7	Molybdenum by ICP-MS	SOLID	LA-505-412	E	J	1.54	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-02-0	Nickel by ICP-MS	SOLID	LA-505-412			6.25	ug/g	0.49	0.24	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7782-49-2	Selenium by ICP-MS	SOLID	LA-505-412	EU	H <	1.46	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-22-4	Silver by ICP-MS	SOLID	LA-505-412		H	0.118	ug/g	0.49	0.097	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-28-0	Thallium by ICP-MS	SOLID	LA-505-412			0.121	ug/g	0.49	0.049	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-29-1	*Thorium* by ICP-MS	SOLID	LA-505-412		H	2.41	ug/g	0.49	0.097	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-61-1	Uranium by ICP-MS	SOLID	LA-505-412		H	118	ug/g	4.86	0.49	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-62-2	Vanadium by ICP-MS	SOLID	LA-505-412		H	104	ug/g	4.86	1.9	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-66-6	Zinc by ICP-MS	SOLID	LA-505-412		H	58.8	ug/g	4.86	19	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	TPH-G	Total Pet. Hydrocarbons Gas	SOLID	NWTPH	U	<	250	ug/kg		2.5e+02	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13981-16-3	Pu-238 by AEA	SOLID	LA-508-471	U		0.0360	pCi/g		0.066	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E.T.C	Pu-238 by AEA Total Cntg Error	SOLID	LA-508-471			120	%		0.0	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E.T.C	Pu-239/240 AEA Total Cntg Err	SOLID	LA-508-471			100	%		0.0	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	PU-239/240	Pu-239/240 by AEA	SOLID	LA-508-471	U		8.90e-03	pCi/g		0.066	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	120-82-1	1,2,4-Trichlorobenzene	SOLID	LA-523-456	U	<	310	ug/kg	1.00	3.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	95-50-1	1,2-Dichlorobenzene (SV)	SOLID	LA-523-456	U	<	380	ug/kg	1.00	3.8e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	541-73-1	1,3-Dichlorobenzene	SOLID	LA-523-456	U	<	340	ug/kg	1.00	3.4e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	106-46-7	1,4-Dichlorobenzene (SV)	SOLID	LA-523-456	U	<	330	ug/kg	1.00	3.3e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	95-95-4	2,4,5-Trichlorophenol	SOLID	LA-523-456	U	<	710	ug/kg	1.00	7.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	88-06-2	2,4,6-Trichlorophenol	SOLID	LA-523-456	U	<	71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	120-83-2	2,4-Dichlorophenol	SOLID	LA-523-456	U	<	85.0	ug/kg	1.00	85	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	105-67-9	2,4-Dimethylphenol	SOLID	LA-523-456	U	<	71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	51-28-5	2,4-Dinitrophenol	SOLID	LA-523-456	U	<	710	ug/kg	1.00	7.1e+02	04/18/03	04/04/03	04/04/03

0000012

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
E - Analyte is an estimate, has potentially larger errors
J - Estimated Value
U - Analyzed for but not detected above limiting criteria.
X - Other flags and notes described in the comments/narrative.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

10/18/07

WSCF
ANALYTICAL RESULTS REPORT

2 - 12

Attention: Steve Trent **Group #:** WSCF20030461
Project: F03-006: 200-PW-2/PW-4

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	E.T.C	Th-234 Rel.% Count Error (GEA)	SOLID	LA-508-462		13.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	15065-10-8	Th-234 by GEA	SOLID	LA-508-462		35.1	pCi/g		1.2	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E.T.C	Tl-208 Rel.% Count Error (GEA)	SOLID	LA-508-462		17.3	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14913-50-9	Tl-208 by GEA	SOLID	LA-508-462		0.137	pCi/g		0.012	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E.T.C	U-235 Rel.% Count Error (GEA)	SOLID	LA-508-462		21.7	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	15117-96-1	U-235 by GEA	SOLID	LA-508-462		0.583	pCi/g		0.11	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E.T.C	Zn-65 Rel.% Count Error (GEA)	SOLID	LA-508-462		432	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13982-39-3	Zn-65 by GEA	SOLID	LA-508-462	U	-3.76e-03	pCi/g		0.023	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-69-9	Bismuth by ICP	SOLID	LA-505-411	U	< 6.11	ug/g	89.90	6.1	05/06/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	~~7440-50-8~~ 7440-42-8	Boron by ICP	SOLID	LA-505-411	E	J 34.10	ug/g	89.90	9.170	05/06/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7429-90-5	Aluminum by ICP-MS	SOLID	LA-505-412	E	J 6.52e+03	ug/g	4.79	53	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-36-0	Antimony by ICP-MS	SOLID	LA-505-412	U	< 0.240	ug/g	0.48	0.24	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-38-2	Arsenic by ICP-MS	SOLID	LA-505-412	E	J 2.07	ug/g	4.79	1.4	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-39-3	Barium by ICP-MS	SOLID	LA-505-412		J 85.8	ug/g	4.79	0.96	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-41-7	Beryllium by ICP-MS	SOLID	LA-505-412		0.256	ug/g	0.48	0.14	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-43-9	Cadmium by ICP-MS	SOLID	LA-505-412		0.208	ug/g	0.48	0.048	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-47-3	Chromium by ICP-MS	SOLID	LA-505-412		4.91	ug/g	0.48	0.14	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-48-4	Cobalt by ICP-MS	SOLID	LA-505-412		10.5	ug/g	0.48	0.096	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-50-8	Copper by ICP-MS	SOLID	LA-505-412		13.0	ug/g	0.48	0.24	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7439-92-1	Lead by ICP-MS	SOLID	LA-505-412		2.78	ug/g	0.48	0.58	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7439-96-5	Manganese by ICP-MS	SOLID	LA-505-412		J 456	ug/g	4.79	1.4	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7439-97-6	Mercury by ICP-MS	SOLID	LA-505-412	U	< 0.0479	ug/g	0.48	0.048	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7439-98-7	Molybdenum by ICP-MS	SOLID	LA-505-412	EU	J < 1.44	ug/g	4.79	1.4	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-02-0	Nickel by ICP-MS	SOLID	LA-505-412		6.90	ug/g	0.48	0.24	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7782-49-2	Selenium by ICP-MS	SOLID	LA-505-412	EU	J < 1.44	ug/g	4.79	1.4	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-22-4	Silver by ICP-MS	SOLID	LA-505-412	U	< 0.0958	ug/g	0.48	0.096	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-28-0	Thallium by ICP-MS	SOLID	LA-505-412		0.103	ug/g	0.48	0.048	04/15/03	04/04/03	04/04/03

6/16/04

0000013

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

10/18/03

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ		Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	7440-29-1	Thorium by ICP-MS	SOLID	LA-505-412			2.73	ug/g	0.48	0.096	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-61-1	Uranium by ICP-MS	SOLID	LA-505-412			130	ug/g	4.79	0.48	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-62-2	Vanadium by ICP-MS	SOLID	LA-505-412			108	ug/g	4.79	1.9	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-66-6	Zinc by ICP-MS	SOLID	LA-505-412			57.3	ug/g	4.79	19	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	TPH-G	Total Pet. Hydrocarbons Gas	SOLID	NWTPH	U	<	250	ug/kg		2.5e+02	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13981-16-3	Pu-238 by AEA	SOLID	LA-508-471	U		0.0200	pCi/g		0.27	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Pu-238 by AEA Total Cntg Error	SOLID	LA-508-471			760	%		0.0	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Pu-239/240 AEA Total Cntg Err	SOLID	LA-508-471			120	%		0.0	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	PU-239/240	Pu-239/240 by AEA	SOLID	LA-508-471			0.0300	pCi/g		0.027	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	120-82-1	1,2,4-Trichlorobenzene	SOLID	LA-523-456	U	<	310	ug/kg	1.00	3.1e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-50-1	1,2-Dichlorobenzene (SV)	SOLID	LA-523-456	U	<	370	ug/kg	1.00	3.7e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	541-73-1	1,3-Dichlorobenzene	SOLID	LA-523-456	U	<	330	ug/kg	1.00	3.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	106-46-7	1,4-Dichlorobenzene (SV)	SOLID	LA-523-456	U	<	330	ug/kg	1.00	3.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-95-4	2,4,5-Trichlorophenol	SOLID	LA-523-456	U	<	76.0	ug/kg	1.00	76	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-06-2	2,4,6-Trichlorophenol	SOLID	LA-523-456	U	<	69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	120-83-2	2,4-Dichlorophenol	SOLID	LA-523-456	U	<	83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	105-67-9	2,4-Dimethylphenol	SOLID	LA-523-456	U	<	69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	51-28-5	2,4-Dinitrophenol	SOLID	LA-523-456	U	<	230	ug/kg	1.00	2.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	121-14-2	2,4-Dinitrotoluene	SOLID	LA-523-456	U	<	69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	606-20-2	2,6-Dinitrotoluene	SOLID	LA-523-456	U	<	69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	111-76-2	2-Butoxyethanol	SOLID	LA-523-456	U	<	100	ug/kg	1.00	1.0e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-58-7	2-Chloronaphthalene	SOLID	LA-523-456	U	<	83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-57-8	2-Chlorophenol	SOLID	LA-523-456	U	<	150	ug/kg	1.00	1.5e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-57-6	2-Methylnaphthalene	SOLID	LA-523-456	U	<	190	ug/kg	1.00	1.9e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-48-7	2-Methylphenol	SOLID	LA-523-456	U	<	69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-74-4	2-Nitroaniline	SOLID	LA-523-456	U	<	69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-75-5	2-Nitrophenol	SOLID	LA-523-456	U	<	180	ug/kg	1.00	1.8e+02	04/22/03	04/04/03	04/04/03

0000147

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.

E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

10/18/03

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

THIS PAGE INTENTIONALLY LEFT BLANK

Sample Delivery Group	**WSCF20030461**
Sample Matrix	**Soil**
Sample Visual	**Brown**
SAF Number	**F03-006**
Data Deliverable	**Summary Report**

Introduction

Two (2) soil samples (B16RX8, B16RX9) from the GPP was received at the WSCF Laboratory on April 4, 2003. The sample was analyzed for those analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Groundwater Protection Program- Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information. Copies of the chain of custody and Request for Sample Analysis forms are included as Attachment 3.

Analytical Methodology for Requested Analyses

- ICP-MS Metals by EPA Method 200.8 and ICP-AES Metals by EPA SW-846 Method 6010A. Analytical work was performed with no deviations to the approved method.
- VOA's by EPA SW-846 Method 8260A. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under EPA SW-846 Method 8015 was reported under this method.
- Semi-VOA's by EPA SW-846 Method 8270B. Analytical work was performed with no deviations to the approved method.
- Alcohols and Glycols by EPA SW-846 Method 8015. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under this method was reported under EPA SW-846 Method 8260A.
- WTPH-D by WDOE Method NWTPH-Dx. Analytical work was performed with no deviations to the approved method.
- WTPH-G by WDOE Method NWTPH-Gx. Analytical work was performed with no deviations to the approved method.

- IC Anions and Ammonium by EPA SW-846 Method 300.0 and 300.7. Analytical work was performed with no deviations to the approved method for Ammonium, but a deviation was required for the Anions (see comments below).

- The pH by EPA Method 150.1. Analytical work was performed with no deviations to the approved method.

- Percent Solids by EPA Method 160.3. Analytical work was performed with no deviations to the approved method.

- Cyanide by EPA SW-846 Method 9010. Analytical work was performed with no deviations to the approved method.

- All RadChem analyses (TA/TB, AEA's, GEA) were run by internal WDOE accredited WSCF procedures. Analytical work was performed with no deviations to the approved method.

Comments

PCB's – This analysis was originally on the Sample Chain of Custody when received at the WSCF Laboratory, but the client later requested the analysis not be run.

ICP-MS and ICP-AES Metals – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-27, 2-28, 2-29, 2-30, and 2-48 for QC details.

VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-36, 2-37 and 2-38 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Semi-VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-44, 2-45, 2-46 and 2-47 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Alcohols and Glycols – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-37 for QC details.

WTPH-D – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-40 for details.

WTPH-G – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-39 for details.

IC Anions – The client requested hold time(s) for this analysis was not met. The client was notified and requested WSCF to continue with this analysis. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-33, 2-34 and 2-36 for QC details.

NH4 – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-38 for QC details.

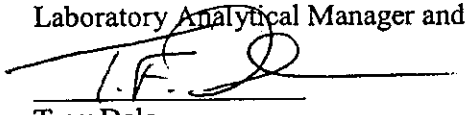
The pH – Per the direction of the chain of custody, the pH was completed within 24 hours of sampling.

Percent Solids – PCB's, VOA's, Semi-VOA's, Alcohols and Glycols, WTPH-G and WTPH-D analytical results were corrected for percent solids. All other analytical results were reported for the sample as received.

CN – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-26 for QC details.

RadChem – There are no hold times associated with these WDOE accredited methods. Except for GEA, a Laboratory Control Sample and Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-31, 2-32, and 2-35 for QC details.

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.



Troy Dale
WSCF Production Control

Abbreviations
Hg – mercury
IC – ion chromatography
ICP – inductively coupled plasma
ICP/AES – ICP/atomic emission spectroscopy
ICP/MS – ICP/mass spectrometry
Total U – total uranium
AT/TB – total alpha/total beta
AEA – Alpha Energy Analysis
WTPH-G – Total Hydrocarbons-Gasoline
Am – americium
Cm - curium
Pu – plutonium
Np – neptunium
GEA – gamma energy analysis
H3 – Tritium
Sr – Strontium 89, 90
WTPH-D – Total Hydrocarbons-Diesel
TSS – Total Suspended Solids

5/5/03

3-3

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-014	Page 1 of 1
Collector: Johansen/Pope/Pfister	Company Contact: LC Hulstrom; Telephone No. 373-3928	Project Coordinator: TRENT, SJ	Price Code 8N; Data Turnaround 30 Days
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: 216-A-19 (C3245) 22.5-25.0 ft	SAF No. F03-006	Air Quality ☐
Ice Chest No. SMC-69	Field Logbook No. HNF-N-3361; COA 117504ES10	Method of Shipment: Government Vehicle	
Shipped To: Waste Sampling & Characterization	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None					
Type of Container	aG	Gs*	P	Snap Vial					
No. of Container(s)	1	3	1	1					
Volume	250mL	40mL	500mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Activity Scan					

000020

20030461

Sample No.	Matrix *	Sample Date	Sample Time										
B16RX8 W03020159	SOIL	4-4-03	1348	X	X	X	X						
B16RX9 W03020160	SOIL	4-4-03	1348	X	X	X	X						

CHAIN OF POSSESSION	Date/Time	Sign/Print Names Received By/Stored In	Date/Time
Relinquished By/Removed From: [signature]	4/4/03 1420	Received By/Stored In: [signature]	4/4/03 1450
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

** The laboratory is to report both kerosene and diesel range compounds from the WTPH-D analysis.

(1) Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G; PCBs - 8082
(2) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(3) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134, Tin-126}; Isotopic Radium {Radium-226, Radium-228}; Isotopic Plutonium; Americium-241; Isotopic Uranium; Trace Elements ICP/MS - 200.8 (Complete) {Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Uranium}; ICP Metals - 6010A (Add-on) {Bismuth, Boron}; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; Cyanide (Total) - 335.2; Cations (IC) - 300.7 {Nitrogen in ammonium}; pH (Soil) - 9045

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

A-6003-618 / EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-PW-2/200-PW-4			DATA PACKAGE: WSCF20030461		
VALIDATOR: TL		LAB: WSCF		DATE: 10/18/03	
CASE:			SDG: 30461		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide	200.8	
SAMPLES/MATRIX					
B16RX8 B16RX9					
				Soil	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

ICP interference checks acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E) ..... Yes No (N/A)
Laboratory blanks analyzed? ..... (Yes) No N/A
Laboratory blank results acceptable? ..... (Yes) No N/A
Field blanks analyzed? (Levels C, D, E) ..... Yes (No) N/A
Field blank results acceptable? (Levels C, D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: NO PB

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD results acceptable? ..... Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
LCS/BSS samples analyzed? ..... (Yes) No N/A
LCS/BSS results acceptable? ..... Yes (No) N/A
Standards traceable? (Levels D, E) ..... Yes No (N/A)
Standards expired? (Levels D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes (No) N/A
Performance audit sample results acceptable? ..... Yes No (N/A)
Comments: arsenic, molybdenum + selenium – low MS/MSD – J all

Silver LCS 147% – J RXB
Thorium LCS – NO LCS J
Boron LCS – 217% J all

NO PA5

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	(Yes)	No	N/A
Duplicate results acceptable?	(Yes)	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
Field duplicate RPD values acceptable?	Yes	No	(N/A)
Field split RPD values acceptable?	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments:_____

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed?	Yes	No	N/A
ICP serial dilution %D values acceptable?	Yes	No	N/A
ICP post digestion spike required?	Yes	No	N/A
ICP post digestion spike values acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments:_____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required?	Yes	No	N/A
Duplicate injection %RSD values acceptable?	Yes	No	N/A
Analytical spikes performed as required?	Yes	No	N/A
Analytical spike recoveries acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
MSA performed as required?	Yes	No	N/A
MSA results acceptable?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments:

8. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	No	N/A
Sample holding times acceptable?	Yes	No	N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses?	Yes	No	N/A
Rresults supported in the raw data? (Levels D, E)	Yes	No	N/A
Samples properly prepared? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments:

Appendix 6

Additional Documentation Requested by Client

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: ICP-2008 MS All possible metal

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

Lab ID: W030000159

BATCH QC ASSOCIATED WITH SAMPLE

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit	
MS	Silver by ICP-MS	7440-22-4	93.284	% Recov	04/15/03	70.000	130.000	
MS	Aluminum by ICP-MS	7429-90-5	n/a	% Recov	04/15/03	70.000	130.000	
MS	Arsenic by ICP-MS	7440-38-2	55.870	% Recov	04/15/03	70.000	130.000	*
MS	Barium by ICP-MS	7440-39-3	n/a	% Recov	04/15/03	70.000	130.000	
MS	Beryllium by ICP-MS	7440-41-7	76.226	% Recov	04/15/03	70.000	130.000	
MS	Cadmium by ICP-MS	7440-43-9	92.217	% Recov	04/15/03	70.000	130.000	
MS	Cobalt by ICP-MS	7440-48-4	86.867	% Recov	04/15/03	70.000	130.000	
MS	Chromium by ICP-MS	7440-47-3	91.898	% Recov	04/15/03	70.000	130.000	
MS	Copper by ICP-MS	7440-50-8	83.582	% Recov	04/15/03	70.000	130.000	
MS	Mercury by ICP-MS	7439-97-6	113.006	% Recov	04/15/03	70.000	130.000	
MS	Manganese by ICP-MS	7439-96-5	n/a	% Recov	04/15/03	70.000	130.000	
MS	Molybdenum by ICP-MS	7439-98-7	56.930	% Recov	04/15/03	70.000	130.000	*
MS	Nickel by ICP-MS	7440-02-0	88.887	% Recov	04/15/03	70.000	130.000	
MS	Lead by ICP-MS	7439-92-1	107.676	% Recov	04/15/03	70.000	130.000	
MS	Antimony by ICP-MS	7440-36-0	97.228	% Recov	04/15/03	70.000	130.000	
MS	Selenium by ICP-MS	7782-49-2	50.000	% Recov	04/15/03	70.000	130.000	*
MS	Thorium by ICP-MS	7440-29-1	118.337	% Recov	04/15/03	70.000	130.000	
MS	Thallium by ICP-MS	7440-28-0	101.706	% Recov	04/15/03	70.000	130.000	
MS	Uranium by ICP-MS	7440-61-1	n/a	% Recov	04/15/03	70.000	130.000	
MS	Vanadium by ICP-MS	7440-62-2	n/a	% Recov	04/15/03	70.000	130.000	
MS	Zinc by ICP-MS	7440-66-6	n/a	% Recov	04/15/03	70.000	130.000	
MSD	Silver by ICP-MS	7440-22-4	92.055	% Recov	04/15/03	70.000	130.000	
MSD	Aluminum by ICP-MS	7429-90-5	n/a	% Recov	04/15/03	70.000	130.000	
MSD	Arsenic by ICP-MS	7440-38-2	65.148	% Recov	04/15/03	70.000	130.000	*
MSD	Barium by ICP-MS	7440-39-3	n/a	% Recov	04/15/03	70.000	130.000	
MSD	Beryllium by ICP-MS	7440-41-7	78.814	% Recov	04/15/03	70.000	130.000	
MSD	Cadmium by ICP-MS	7440-43-9	91.419	% Recov	04/15/03	70.000	130.000	
MSD	Cobalt by ICP-MS	7440-48-4	87.606	% Recov	04/15/03	70.000	130.000	
MSD	Chromium by ICP-MS	7440-47-3	90.572	% Recov	04/15/03	70.000	130.000	
MSD	Copper by ICP-MS	7440-50-8	84.640	% Recov	04/15/03	70.000	130.000	
MSD	Mercury by ICP-MS	7439-97-6	114.407	% Recov	04/15/03	70.000	130.000	
MSD	Manganese by ICP-MS	7439-96-5	n/a	% Recov	04/15/03	70.000	130.000	
MSD	Molybdenum by ICP-MS	7439-98-7	57.627	% Recov	04/15/03	70.000	130.000	*
MSD	Nickel by ICP-MS	7440-02-0	90.254	% Recov	04/15/03	70.000	130.000	
MSD	Lead by ICP-MS	7439-92-1	103.814	% Recov	04/15/03	70.000	130.000	
MSD	Antimony by ICP-MS	7440-36-0	92.479	% Recov	04/15/03	70.000	130.000	
MSD	Selenium by ICP-MS	7782-49-2	52.331	% Recov	04/15/03	70.000	130.000	*
MSD	Thorium by ICP-MS	7440-29-1	118.644	% Recov	04/15/03	70.000	130.000	
MSD	Thallium by ICP-MS	7440-28-0	101.807	% Recov	04/15/03	70.000	130.000	
MSD	Uranium by ICP-MS	7440-61-1	n/a	% Recov	04/15/03	70.000	130.000	
MSD	Vanadium by ICP-MS	7440-62-2	n/a	% Recov	04/15/03	70.000	130.000	
MSD	Zinc by ICP-MS	7440-66-6	n/a	% Recov	04/15/03	70.000	130.000	

BATCH QC

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: ICP-2008 MS All possible metal

SAF Number: F03-006
Sample Date:
Receive Date:

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
BLANK	Silver by ICP-MS	7440-22-4	<0.200	ug/L	04/15/03	-0.440	0.440
BLANK	Aluminum by ICP-MS	7429-90-5	<11.0	ug/L	04/15/03	-24.200	24.200
BLANK	Arsenic by ICP-MS	7440-38-2	<0.300	ug/L	04/15/03	-0.660	0.660
BLANK	Barium by ICP-MS	7440-39-3	<0.200	ug/L	04/15/03	-0.440	0.440
BLANK	Beryllium by ICP-MS	7440-41-7	<0.300	ug/L	04/15/03	-0.660	0.660
BLANK	Cadmium by ICP-MS	7440-43-9	<0.100	ug/L	04/15/03	-0.220	0.220
BLANK	Cobalt by ICP-MS	7440-48-4	<0.200	ug/L	04/15/03	-0.440	0.440
BLANK	Chromium by ICP-MS	7440-47-3	<0.300	ug/L	04/15/03	-0.660	0.660
BLANK	Copper by ICP-MS	7440-50-8	0.766	ug/L	04/15/03	-1.100	1.100
BLANK	Mercury by ICP-MS	7439-97-6	<0.100	ug/L	04/15/03	-0.220	0.220
BLANK	Manganese by ICP-MS	7439-96-5	<0.300	ug/L	04/15/03	-0.660	0.660
BLANK	Molybdenum by ICP-MS	7439-98-7	<0.300	ug/L	04/15/03	-0.660	0.660
BLANK	Nickel by ICP-MS	7440-02-0	<0.500	ug/L	04/15/03	-1.100	1.100
BLANK	Lead by ICP-MS	7439-92-1	<1.20	ug/L	04/15/03	-2.640	2.640
BLANK	Antimony by ICP-MS	7440-36-0	1.78	ug/L	04/15/03	-1.100	1.100
BLANK	Selenium by ICP-MS	7782-49-2	<0.300	ug/L	04/15/03	-0.660	0.660
BLANK	Thorium by ICP-MS	7440-29-1	<0.200	ug/L	04/15/03	-0.440	0.440
BLANK	Thallium by ICP-MS	7440-28-0	<0.100	ug/L	04/15/03	-0.220	0.220
BLANK	Uranium by ICP-MS	7440-61-1	<0.100	ug/L	04/15/03	-0.220	0.220
BLANK	Vanadium by ICP-MS	7440-62-2	<0.400	ug/L	04/15/03	-0.880	0.880
BLANK	Zinc by ICP-MS	7440-66-6	<4.00	ug/L	04/15/03	-8.800	8.800
LCS	Silver by ICP-MS	7440-22-4	147.899	% Recov	04/15/03	85.000	115.000
LCS	Aluminum by ICP-MS	7429-90-5	112.057	% Recov	04/15/03	85.000	115.000
LCS	Arsenic by ICP-MS	7440-38-2	107.692	% Recov	04/15/03	85.000	115.000
LCS	Barium by ICP-MS	7440-39-3	104.847	% Recov	04/15/03	85.000	115.000
LCS	Beryllium by ICP-MS	7440-41-7	106.242	% Recov	04/15/03	85.000	115.000
LCS	Cadmium by ICP-MS	7440-43-9	105.394	% Recov	04/15/03	85.000	115.000
LCS	Cobalt by ICP-MS	7440-48-4	99.075	% Recov	04/15/03	85.000	115.000
LCS	Chromium by ICP-MS	7440-47-3	106.012	% Recov	04/15/03	85.000	115.000
LCS	Copper by ICP-MS	7440-50-8	104.724	% Recov	04/15/03	85.000	115.000
LCS	Mercury by ICP-MS	7439-97-6	100.744	% Recov	04/15/03	85.000	115.000
LCS	Manganese by ICP-MS	7439-96-5	102.798	% Recov	04/15/03	85.000	115.000
LCS	Molybdenum by ICP-MS	7439-98-7	102.303	% Recov	04/15/03	85.000	115.000
LCS	Nickel by ICP-MS	7440-02-0	99.522	% Recov	04/15/03	85.000	115.000
LCS	Lead by ICP-MS	7439-92-1	114.288	% Recov	04/15/03	85.000	115.000
LCS	Antimony by ICP-MS	7440-36-0	113.768	% Recov	04/15/03	85.000	115.000
LCS	Selenium by ICP-MS	7782-49-2	108.772	% Recov	04/15/03	85.000	115.000
LCS	Thorium by ICP-MS	7440-29-1	n/a	% Recov	04/15/03	85.000	115.000
LCS	Thallium by ICP-MS	7440-28-0	110.442	% Recov	04/15/03	85.000	115.000
LCS	Uranium by ICP-MS	7440-61-1	101.523	% Recov	04/15/03	85.000	115.000
LCS	Vanadium by ICP-MS	7440-62-2	103.659	% Recov	04/15/03	85.000	115.000
LCS	Zinc by ICP-MS	7440-66-6	114.717	% Recov	04/15/03	85.000	115.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000157							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Bismuth by ICP	7440-69-9	94.800	% Recov	05/06/03	75.000	125.000
MSD	Bismuth by ICP	7440-69-9	94.540	% Recov	05/06/03	75.000	125.000
Lab ID: W030000158							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Bismuth by ICP	7440-69-9	94.780	% Recov	05/06/03	75.000	125.000
MSD	Bismuth by ICP	7440-69-9	95.040	% Recov	05/06/03	75.000	125.000
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Bismuth by ICP	7440-69-9	94.260	% Recov	05/06/03	75.000	125.000
MSD	Bismuth by ICP	7440-69-9	93.540	% Recov	05/06/03	75.000	125.000
SPK-RPD	Bismuth by ICP	7440-69-9	0.767	RPD	05/06/03	0.000	20.000
BATCH QC							
BLANK	Bismuth by ICP	7440-69-9	<6.8e-2	ug/L	05/06/03	-1.000	0.068
LCS	Bismuth by ICP	7440-69-9	115.200	% Recov	05/06/03	80.000	120.000
Lab ID: W030000157							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Boron by ICP	7440-50-8	102.780	% Recov	05/06/03	70.000	130.000
MSD	Boron by ICP	7440-50-8	101.300	% Recov	05/06/03	75.000	125.000
Lab ID: W030000158							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Boron by ICP	7440-50-8	101.160	% Recov	05/06/03	70.000	130.000
MSD	Boron by ICP	7440-50-8	100.840	% Recov	05/06/03	75.000	125.000
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Boron by ICP	7440-50-8	100.820	% Recov	05/06/03	70.000	130.000
MSD	Boron by ICP	7440-50-8	100.040	% Recov	05/06/03	75.000	125.000
SPK-RPD	Boron by ICP	7440-50-8	-0.135	RPD	05/06/03	0.000	20.000
BATCH QC							
BLANK	Boron by ICP	7440-50-8	<9.5	ug/L	05/06/03	-10.000	10.000
LCS	Boron by ICP	7440-50-8	217.163	% Recov	05/06/03	52.000	84.200

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000157							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Bismuth by ICP	7440-69-9	94.800	% Recov	05/06/03	75.000	125.000
MSD	Bismuth by ICP	7440-69-9	94.540	% Recov	05/06/03	75.000	125.000
Lab ID: W030000158							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Bismuth by ICP	7440-69-9	94.780	% Recov	05/06/03	75.000	125.000
MSD	Bismuth by ICP	7440-69-9	95.040	% Recov	05/06/03	75.000	125.000
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Bismuth by ICP	7440-69-9	94.260	% Recov	05/06/03	75.000	125.000
MSD	Bismuth by ICP	7440-69-9	93.540	% Recov	05/06/03	75.000	125.000
SPK-RPD	Bismuth by ICP	7440-69-9	0.767	RPD	05/06/03	0.000	20.000
BATCH QC							
BLANK	Bismuth by ICP	7440-69-9	<6.8e-2	ug/L	05/06/03	-1.000	0.068
LCS	Bismuth by ICP	7440-69-9	116.200	% Recov	05/06/03	80.000	120.000
Lab ID: W030000157							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Boron by ICP	7440-50-8	102.780	% Recov	05/06/03	70.000	130.000
MSD	Boron by ICP	7440-50-8	101.300	% Recov	05/06/03	75.000	125.000
Lab ID: W030000158							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Boron by ICP	7440-50-8	101.160	% Recov	05/06/03	70.000	130.000
MSD	Boron by ICP	7440-50-8	100.840	% Recov	05/06/03	75.000	125.000
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Boron by ICP	7440-50-8	100.820	% Recov	05/06/03	70.000	130.000
MSD	Boron by ICP	7440-50-8	100.040	% Recov	05/06/03	75.000	125.000
SPK-RPD	Boron by ICP	7440-50-8	0.135	RPD	05/06/03	0.000	20.000
BATCH QC							
BLANK	Boron by ICP	7440-50-8	<9.5	ug/L	05/06/03	-10.000	10.000
LCS	Boron by ICP	7440-50-8	217.163	% Recov	05/06/03	52.000	84.200

Date: 17 November 2003
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling
Subject: Radiochemistry - Data Package No. 30461 (SDG No. 30461)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. 30461 which was prepared by WSCF. A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16RX8	4/4/03	Soil	C	See note 1 & 2
B16RX9	4/4/03	Soil	C	See note 1 & 2

1 - Gamma spectroscopy and alpha spectroscopy.
2 - Gamma spectroscopy results for sample B16RX6 were re-analyzed and reported separately in data package WSCF20031181. It is the re-analysis data that was validated and is contained in this report. Due to an exponent error, the americium(gea) result was corrected and SDG WSCF20031181was re-reported.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Laboratory (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the required detection limit (RDL), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

Due to laboratory blank contamination , all bismuth-214 and radium-226 results in sample B16RX8 and the lead-214 result in sample B16RX9 were qualified as estimates and flagged "J".

All other laboratory blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 80-120%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

All accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample

and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than +/- 35 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate Samples

No field duplicate results were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against the target quanitiation limits (TQLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TQL.

- **Completeness**

Data package SDG No. 305461 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to laboratory blank contamination , all bismuth-214 and radium-226 results in sample B16RX8 and the lead-214 result in sample B16RX9 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the FHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: 30461	REVIEWER: TLI	DATE: 11/17/03	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Bismuth-214 Radium-226	J	All	Blank contamination
Lead-214	J	B16RX9	Blank contamination

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: FLUOR-HANFORD											
Laboratory: WSCF											
Case	SDG: WSCF20030461										
Sample Number		B16RX8		B16RX9							
Remarks											
Location											
Sample Date		4/4/03		4/4/03							
Radiochemistry	TQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Americium-241	1	0.170	U	0.0210	U						
Plutonium-238	1	0.0360	U	0.0200	U						
Plutonium-239/240	1	0.00890	U	0.0300							
Uranium-234	1	3.60		5.40							
Uranium-235	1	0.420		0.650							
Uranium-238	1	28.0		41.0							
Cobalt-60	0.05	-0.00634	U	-0.00455	U						
Antimony-125		0.0251	U	0.0132	U						
Cesium-134		0.0251	U	0.0294	U						
Cesium-137	0.1	-0.0159	U	-0.00593	U						
Europium 152	0.1	-0.00318	U	-0.0297	U						
Europium 154	0.1	-0.0182	U	-0.00451	U						
Europium 155	0.1	-0.00959	U	0.0588	U						
Tin-126		0.00719	U	-0.0238	U						
Radium-228	0.2	0.586		0.515							
Radium-226	0.1	0.484	J	0.372	J						
Zinc-65		-0.000280	U	0.0132	U						
Niobium-94		-0.00141	U	0.00731	U						
Ru-103		0.00400	U	-0.00162	U						
Ru-106		0.0406	U	-0.0290	U						
Tin-113		-0.00307	U	0.00118	U						
Cerium-144		0.0162	U	0.00552	U						
Thallium-208		0.182		0.169							
Bismuth-212		0.467		0.316							
Lead-212		0.588		0.558							
Bismuth-214		0.484	J	0.372	J						
Lead-214		0.533		0.426	J						
Actinium-228		0.586		0.515							
Thorium-234		34.4		37.3							
Uranium-235		0.517		0.618							
Americium-241		1.88 e-10	U	0.895	U						

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

WSCF
ANALYTICAL RESULTS REPORT

2 - 3

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	7664-41-7	Ammonia (N) by IC	SOLID	LA-503-401		6.22	ug/g	50.00	0.20	04/23/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	57-12-5	Cyanide by Midi/Spectrophotom	SOLID	LA-695-402	U	< 0.200	mg/kg	0.98	0.20	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	TS	Percent Solids	SOLID	LA-519-412		94.1	%		0.0	04/22/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	PH	pH Soil and Waste Measurement	SOLID	LA-212-411		9.60	pH		0.010	04/22/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	12587-46-1	Alpha by liquid scintillation	SOLID	LA-508-421		12.0	pCi/g		1.7	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP		Alpha error by LC	SOLID	LA-508-421		41.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	12587-47-2	Beta by liquid scintillation	SOLID	LA-508-421		35.0	pCi/g		3.1	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP		Beta error by LC	SOLID	LA-508-421		30.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	540-51-2	2-Bromoethanol	SOLID	Organics		1.40e+04	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	60-29-7	Diethyl ether	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	107-21-1	Ethylene glycol	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	67-56-1	Methanol	SOLID	Organics	U	< 1.00e+03	ug/kg		1.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14596-10-2	Am-241 by AEA	SOLID	LA-508-471	U	0.170	pCi/g		0.26	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Am-241 by AEA Total Cntg Error	SOLID	LA-508-471		98.0	%		0.0	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	24959-67-9	Bromide (Br) by IC	SOLID	LA-533-410	U	< 0.900	ug/g	20.00	0.90	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	16887-00-6	Chloride (Cl) by IC	SOLID	LA-533-410		20.7	ug/g	20.00	0.28	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	16984-48-8	Fluoride (F) by IC	SOLID	LA-533-410	BX	0.981	ug/g	20.00	0.14	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	NO3-N	Nitrate (N) by IC	SOLID	LA-533-410		447	ug/g	9.89e+002	4.9	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	NO2-N	Nitrite (N) by IC	SOLID	LA-533-410	B	0.451	ug/g	20.00	0.18	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14265-44-2	Phosphate (P) by IC	SOLID	LA-533-410	B	4.33	ug/g	20.00	0.26	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14808-79-8	Sulfate (SO4) by IC	SOLID	LA-533-410		118	ug/g	20.00	0.48	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Ac-228 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.8	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14331-83-0	Ac-228 by GEA	SOLID	LA-508-462		0.460	pCi/g		0.036	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Am-241 Rel.% Count Error (GEA)	SOLID	LA-508-462		23.4	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14596-10-2	Am-241 by GEA	SOLID	LA-508-462	U	0.726	pCi/g		0.22	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Bi-212 Rel.% Count Error (GEA)	SOLID	LA-508-462		33.6	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14913-49-6	Bi-212 by GEA	SOLID	LA-508-462		0.270	pCi/g		0.092	04/08/03	04/04/03	04/04/03

0000141

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
E - Analyte is an estimate, has potentially larger errors
J - Estimated Value
U - Analyzed for but not detected above limiting criteria.
X - Other flags and notes described in the comments/narrative.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2-6

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	7440-50-8	Copper by ICP-MS	SOLID	LA-505-412		12.9	ug/g	0.49	0.24	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-92-1	Lead by ICP-MS	SOLID	LA-505-412		2.80	ug/g	0.49	0.58	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-96-5	Manganese by ICP-MS	SOLID	LA-505-412		433	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-97-6	Mercury by ICP-MS	SOLID	LA-505-412	U	< 0.0486	ug/g	0.49	0.049	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7439-98-7	Molybdenum by ICP-MS	SOLID	LA-505-412	E	1.54	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-02-0	Nickel by ICP-MS	SOLID	LA-505-412		6.25	ug/g	0.49	0.24	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7782-49-2	Selenium by ICP-MS	SOLID	LA-505-412	EU	< 1.46	ug/g	4.86	1.5	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-22-4	Silver by ICP-MS	SOLID	LA-505-412		0.118	ug/g	0.49	0.097	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-28-0	Thallium by ICP-MS	SOLID	LA-505-412		0.121	ug/g	0.49	0.049	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-29-1	Thorium by ICP-MS	SOLID	LA-505-412		2.41	ug/g	0.49	0.097	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-61-1	Uranium by ICP-MS	SOLID	LA-505-412		118	ug/g	4.86	0.49	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-62-2	Vanadium by ICP-MS	SOLID	LA-505-412		104	ug/g	4.86	1.9	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	7440-66-6	Zinc by ICP-MS	SOLID	LA-505-412		58.8	ug/g	4.86	19	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	TPH-G	Total Pet. Hydrocarbons Gas	SOLID	NWTPH	U	< 250	ug/kg		2.5e+02	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13981-16-3	Pu-238 by AEA	SOLID	LA-508-471	U	0.0360	pCi/g		0.066	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Pu-238 by AEA Total Cntg Error	SOLID	LA-508-471		120	%		0.0	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Pu-239/240 AEA Total Cntg Err	SOLID	LA-508-471		100	%		0.0	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	PU-239/240	Pu-239/240 by AEA	SOLID	LA-508-471	U	8.90e-03	pCi/g		0.066	04/17/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	120-82-1	1,2,4-Trichlorobenzene	SOLID	LA-523-456	U	< 310	ug/kg	1.00	3.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	95-50-1	1,2-Dichlorobenzene (SV)	SOLID	LA-523-456	U	< 380	ug/kg	1.00	3.8e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	541-73-1	1,3-Dichlorobenzene	SOLID	LA-523-456	U	< 340	ug/kg	1.00	3.4e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	106-46-7	1,4-Dichlorobenzene (SV)	SOLID	LA-523-456	U	< 330	ug/kg	1.00	3.3e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	95-95-4	2,4,5-Trichlorophenol	SOLID	LA-523-456	U	< 710	ug/kg	1.00	7.1e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	88-06-2	2,4,6-Trichlorophenol	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	120-83-2	2,4-Dichlorophenol	SOLID	LA-523-456	U	< 85.0	ug/kg	1.00	85	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	105-67-9	2,4-Dimethylphenol	SOLID	LA-523-456	U	< 71.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	51-28-5	2,4-Dinitrophenol	SOLID	LA-523-456	U	< 710	ug/kg	1.00	7.1e+02	04/18/03	04/04/03	04/04/03

0010012

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
E - Analyte is an estimate, has potentially larger errors
J - Estimated Value
U - Analyzed for but not detected above limiting criteria.
X - Other flags and notes described in the comments/narrative.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

4/18/03

WSCF
ANALYTICAL RESULTS REPORT

2 - 9

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	126-73-8	Tri-n-butylphosphate	SOLID	LA-523-456	J	94.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-44-4	bis(-2-Chloroethyl)Eth	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-91-1	bis(2-Chloroethoxy)methane	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13966-29-5	U-234 by AEA	SOLID	LA-508-471		3.60	pCi/g		0.099	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-234 by AEA Total Cntg Error	SOLID	LA-508-471		22.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	15117-96-1	U-235 by AEA	SOLID	LA-508-471		0.420	pCi/g		0.093	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-235 by AEA Total Cntg Error	SOLID	LA-508-471		38.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	24678-82-8	U-238 by AEA	SOLID	LA-508-471		28.0	pCi/g		0.067	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-238 by AEA Total Cntg Error	SOLID	LA-508-471		19.0	%		0.10	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	75-35-4	1,1-Dichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-36-3	1-Butanol	SOLID	LA-523-455	U	< 21.0	ug/kg	1.00	21	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-43-2	Benzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-90-7	Chlorobenzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-88-3	Toluene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	79-01-6	Trichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	8008-20-6	Kerosene	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	68476-34-6	Total Pet. Hydrocarbons Diesel	SOLID	NWTPH	J	7.80e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	84-15-1	ortho-Terphenyl	SOLID	NWTPH		2.00e+04	ug/kg	1.00	2.1e+02	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7664-41-7	Ammonia (N) by IC	SOLID	LA-503-401		6.79	ug/g	50.00	0.20	04/23/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	57-12-5	Cyanide by Midi/Spectrophotom	SOLID	LA-695-402	U	< 0.200	mg/kg	0.99	0.20	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	TS	Percent Solids	SOLID	LA-519-412		94.1	%		0.0	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	PH	pH Soil and Waste Measurement	SOLID	LA-212-411		9.59	pH		0.010	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-46-1	Alpha by liquid scintillation	SOLID	LA-508-421		12.0	pCi/g		1.8	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Alpha error by LC	SOLID	LA-508-421		50.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-47-2	Beta by liquid scintillation	SOLID	LA-508-421		35.0	pCi/g		3.4	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Beta error by LC	SOLID	LA-508-421		31.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	540-51-2	2-Bromoethanol	SOLID	Organics		1.30e+04	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03

0001313

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2 - 10

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	60-29-7	Diethyl ether	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	107-21-1	Ethylene glycol	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	67-56-1	Methanol	SOLID	Organics	U	< 1.00e+03	ug/kg		1.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14596-10-2	Am-241 by AEA	SOLID	LA-508-471	U	0.0210	pCi/g		0.31	04/18/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Am-241 by AEA Total Cntg Error	SOLID	LA-508-471		840	%		0.0	04/18/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	24959-67-9	Bromide (Br) by IC	SOLID	LA-533-410	U	< 0.855	ug/g	19.00	0.86	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	16887-00-6	Chloride (Cl) by IC	SOLID	LA-533-410		19.4	ug/g	19.00	0.27	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	16984-48-8	Fluoride (F) by IC	SOLID	LA-533-410		1.03	ug/g	19.00	0.13	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	NO3-N	Nitrate (N) by IC	SOLID	LA-533-410		415	ug/g	9.82e+002	4.9	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	NO2-N	Nitrite (N) by IC	SOLID	LA-533-410		0.406	ug/g	19.00	0.17	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14265-44-2	Phosphate (P) by IC	SOLID	LA-533-410		5.04	ug/g	19.00	0.25	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14808-79-8	Sulfate (SO4) by IC	SOLID	LA-533-410		114	ug/g	19.00	0.46	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Ac-228 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.8	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14331-83-0	Ac-228 by GEA	SOLID	LA-508-462		0.429	pCi/g		0.037	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Am-241 Rel.% Count Error (GEA)	SOLID	LA-508-462		78.4	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14596-10-2	Am-241 by GEA	SOLID	LA-508-462	U	0.152	pCi/g		0.17	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Bi-212 Rel.% Count Error (GEA)	SOLID	LA-508-462		30.9	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14913-49-6	Bi-212 by GEA	SOLID	LA-508-462		0.288	pCi/g		0.093	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Bi-214 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.6	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14733-03-0	Bi-214 by GEA	SOLID	LA-508-462		0.362	pCi/g		0.023	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Ce-144 Rel.% Count Error (GEA)	SOLID	LA-508-462		392	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14762-78-8	Ce-144 by GEA	SOLID	LA-508-462	U	0.0198	pCi/g		0.12	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Co-60 Rel.% Count Error (GEA)	SOLID	LA-508-462		322	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	10198-40-0	Co-60 by GEA	SOLID	LA-508-462	U	1.96e-03	pCi/g		0.011	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Cs-134 Rel.% Count Error (GEA)	SOLID	LA-508-462		68.6	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13967-70-9	Cs-134 by GEA	SOLID	LA-508-462	U	0.0227	pCi/g		0.015	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Cs-137 Rel.% Count Error (GEA)	SOLID	LA-508-462		1.00e+03	%		0.0	04/09/03	04/04/03	04/04/03

0000144

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

6/18/03

WSCF
ANALYTICAL RESULTS REPORT

2 - 13

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	7440-29-1	Thorium by ICP-MS	SOLID	LA-505-412		2.73	ug/g	0.48	0.096	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-61-1	Uranium by ICP-MS	SOLID	LA-505-412		130	ug/g	4.79	0.48	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-62-2	Vanadium by ICP-MS	SOLID	LA-505-412		108	ug/g	4.79	1.9	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7440-66-6	Zinc by ICP-MS	SOLID	LA-505-412		57.3	ug/g	4.79	19	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	TPH-G	Total Pet. Hydrocarbons Gas	SOLID	NWTPH	U	< 250	ug/kg		2.5e+02	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13981-16-3	Pu-238 by AEA	SOLID	LA-508-471	U	0.0200	pCi/g		0.27	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Pu-238 by AEA Total Cntg Error	SOLID	LA-508-471		760	%		0.0	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Pu-239/240 AEA Total Cntg Err	SOLID	LA-508-471		120	%		0.0	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	PU-239/240	Pu-239/240 by AEA	SOLID	LA-508-471		0.0300	pCi/g		0.027	04/17/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	120-82-1	1,2,4-Trichlorobenzene	SOLID	LA-523-456	U	< 310	ug/kg	1.00	3.1e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-50-1	1,2-Dichlorobenzene (SV)	SOLID	LA-523-456	U	< 370	ug/kg	1.00	3.7e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	541-73-1	1,3-Dichlorobenzene	SOLID	LA-523-456	U	< 330	ug/kg	1.00	3.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	106-46-7	1,4-Dichlorobenzene (SV)	SOLID	LA-523-456	U	< 330	ug/kg	1.00	3.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-95-4	2,4,5-Trichlorophenol	SOLID	LA-523-456	U	< 76.0	ug/kg	1.00	76	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-06-2	2,4,6-Trichlorophenol	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	120-83-2	2,4-Dichlorophenol	SOLID	LA-523-456	U	< 83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	105-67-9	2,4-Dimethylphenol	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	51-28-5	2,4-Dinitrophenol	SOLID	LA-523-456	U	< 230	ug/kg	1.00	2.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	121-14-2	2,4-Dinitrotoluene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	606-20-2	2,6-Dinitrotoluene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	111-76-2	2-Butoxyethanol	SOLID	LA-523-456	U	< 100	ug/kg	1.00	1.0e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-58-7	2-Chloronaphthalene	SOLID	LA-523-456	U	< 83.0	ug/kg	1.00	83	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-57-8	2-Chlorophenol	SOLID	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-57-6	2-Methylnaphthalene	SOLID	LA-523-456	U	< 190	ug/kg	1.00	1.9e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	95-48-7	2-Methylphenol	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-74-4	2-Nitroaniline	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	88-75-5	2-Nitrophenol	SOLID	LA-523-456	U	< 180	ug/kg	1.00	1.8e+02	04/22/03	04/04/03	04/04/03

0000015

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	84-66-2	Diethylphthalate	SOLID	LA-523-456	B	1.00e+03	ug/kg	1.00	1.9e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	131-11-3	Dimethylphthalate	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	206-44-0	Fluoranthene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	86-73-7	Fluorene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	118-74-1	Hexachlorobenzene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	87-68-3	Hexachlorobutadiene	SOLID	LA-523-456	U	< 380	ug/kg	1.00	3.8e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	77-47-4	Hexachlorocyclopentadiene	SOLID	LA-523-456	U	< 330	ug/kg	1.00	3.3e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	67-72-1	Hexachloroethane	SOLID	LA-523-456	U	< 490	ug/kg	1.00	4.9e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	193-39-5	Indeno(1,2,3-cd)pyrene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	78-59-1	Isophorone	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	621-64-7	N-Nitroso-di-n-propylamine	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	86-30-6	N-Nitrosodiphenylamine	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	91-20-3	Naphthalene	SOLID	LA-523-456	U	< 300	ug/kg	1.00	3.0e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	98-95-3	Nitrobenzene	SOLID	LA-523-456	U	< 270	ug/kg	1.00	2.7e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	87-86-5	Pentachlorophenol	SOLID	LA-523-456	U	< 310	ug/kg	1.00	3.1e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	85-01-8	Phenanthrene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	108-95-2	Phenol	SOLID	LA-523-456	U	< 100	ug/kg	1.00	1.0e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	129-00-0	Pyrene	SOLID	LA-523-456	U	< 69.0	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	126-73-8	Tri-n-butylphosphate	SOLID	LA-523-456	J	100	ug/kg	1.00	69	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	111-44-4	bis(-2-Chloroethyl)Eth	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	111-91-1	bis(2-Chloroethoxy)methane	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13966-29-5	U-234 by AEA	SOLID	LA-508-471		5.40	pCi/g		0.095	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	U-234 by AEA Total Cntg Error	SOLID	LA-508-471		21.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	15117-96-1	U-235 by AEA	SOLID	LA-508-471		0.650	pCi/g		0.030	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	U-235 by AEA Total Cntg Error	SOLID	LA-508-471		32.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	24678-82-8	U-238 by AEA	SOLID	LA-508-471		41.0	pCi/g		0.11	04/28/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	U-238 by AEA Total Cntg Error	SOLID	LA-508-471		20.0	%		0.10	04/28/03	04/04/03	04/04/03

0000016

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2-5

Attention: Steve Trent **Group #:** WSCF20031181
Project: F03-006: 200-PW-2/PW-4

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000732	B16RX7 DUP 20030460	E,T,C	U-235 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.101	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	13982-39-3	Zinc-65	SOIL	LA-508-462	U	0.0201	pCi/g	1.00	0.027	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Zn-65 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0178	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	14331-83-0	Actinium-228	SOIL	LA-508-462		0.552	pCi/g	1.00	0.039	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Ac-228 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0795	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	14913-49-6	Bismuth-212	SOIL	LA-508-462		0.424	pCi/g	1.00	0.088	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Bi-212 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.128	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	14733-03-0	Bismuth-214	SOIL	LA-508-462		0.435	pCi/g	1.00	0.022	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Bi-214 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0600	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	15092-94-1	Lead-212	SOIL	LA-508-462		0.577	pCi/g	1.00	0.022	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Pb-212 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0537	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	15067-28-4	Lead-214	SOIL	LA-508-462		0.484	pCi/g	1.00	0.024	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Pb-214 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0503	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	13968-53-1	Ruthenium-103	SOIL	LA-508-462	U	-1.31e-03	pCi/g	1.00	0.011	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Ru-103 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 6.31e-03	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	13966-06-8	Tin-113	SOIL	LA-508-462	U	2.34e-03	pCi/g	1.00	0.014	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Sn-113 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 8.70e-03	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	14913-50-9	Thallium-208	SOIL	LA-508-462		0.182	pCi/g	1.00	0.011	09/10/03	04/04/03	08/27/03
W030000732	B16RX7 DUP 20030460	E,T,C	Tl-208 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0260	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14596-10-2	Americium-241	SOIL	LA-508-462	U	0.188	pCi/g	1.00	0.19	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Am-241 Rel Count Error (GEA)	SOIL	LA-508-462		+- 0.130	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14234-35-6	Antimony-125	SOIL	LA-508-462	U	6.85e-03	pCi/g	1.00	0.041	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Sb-125 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0238	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14762-78-8	Cerium-144	SOIL	LA-508-462	U	0.0162	pCi/g	1.00	0.15	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Ce-144 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.101	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	10198-40-0	Cobalt-60	SOIL	LA-508-462	U	-6.34e-03	pCi/g	1.00	0.014	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Co-60 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 8.50e-03	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03

0000137

MDL=Minimum Detection Limit U - Analyzed for but not detected above limiting criteria.
RQ=Result Qualifier

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report WGPP/ver. 1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2-6

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20031181

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000733	B16RX8 DUP 20030461	13967-70-9	Cesium-134	SOIL	LA-508-462	U	0.0251	pCi/g	1.00	0.019	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Cs-134 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0111	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	10045-97-3	Cesium-137	SOIL	LA-508-462	U	-0.0159	pCi/g	1.00	0.015	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Cs-137 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0159	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14683-23-9	Europium-152	SOIL	LA-508-462	U	-3.18e-03	pCi/g	1.00	0.044	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Eu-152 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0318	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	15585-10-1	Europium-154	SOIL	LA-508-462	U	-0.0182	pCi/g	1.00	0.043	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Eu-154 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0315	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14391-16-3	Europium-155	SOIL	LA-508-462	U	-9.59e-03	pCi/g	1.00	0.090	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Eu-155 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0531	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14681-63-1	Niobium-94	SOIL	LA-508-462	U	-1.41e-03	pCi/g	1.00	0.014	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Nb-94 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 8.71e-03	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	13982-63-3	Radium-226	SOIL	LA-508-462	H	0.484	pCi/g	1.00	0.028	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Ra-226 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0770	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	15262-20-1	Radium-228	SOIL	LA-508-462		0.586	pCi/g	1.00	0.047	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Ra-228 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0961	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	13967-48-1	Ruthenium-106	SOIL	LA-508-462	U	0.0406	pCi/g	1.00	0.13	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Ru-106 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0792	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	15832-50-5	Tin-126	SOIL	LA-508-462	U	7.19e-03	pCi/g	1.00	8.0e-03	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Sn-126 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0599	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	15065-10-8	Thorium-234	SOIL	LA-508-462		34.4	pCi/g	1.00	1.4	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Th-234 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 3.75	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	15117-96-1	Uranium-235	SOIL	LA-508-462		0.517	pCi/g	1.00	0.15	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	U-235 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.129	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	13982-39-3	Zinc-65	SOIL	LA-508-462	U	-2.80e-04	pCi/g	1.00	0.032	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Zn-65 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 2.80e-03	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14331-83-0	Actinium-228	SOIL	LA-508-462		0.586	pCi/g	1.00	0.047	09/10/03	04/04/03	08/27/03

0000018

MDL=Minimum Detection Limit U - Analyzed for but not detected above limiting criteria.
RQ=Result Qualifier

10/23/03

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report WGPP/ver. 1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2 - 7

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20031181

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000733	B16RX8 DUP 20030461	E,T,C	Ac-228 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0961	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14913-49-6	Bismuth-212	SOIL	LA-508-462		0.467	pCi/g	1.00	0.12	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Bi-212 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.147	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14733-03-0	Bismuth-214	SOIL	LA-508-462	4	0.484	pCi/g	1.00	0.028	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Bi-214 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0770	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	15092-94-1	Lead-212	SOIL	LA-508-462		0.588	pCi/g	1.00	0.033	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Pb-212 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0588	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	15067-28-4	Lead-214	SOIL	LA-508-462	4	0.533	pCi/g	1.00	0.033	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Pb-214 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0618	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	13968-53-1	Ruthenium-103	SOIL	LA-508-462	U	4.00e-03	pCi/g	1.00	0.014	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Ru-103 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 8.40e-03	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	13966-06-8	Tin-113	SOIL	LA-508-462	U	-3.07e-03	pCi/g	1.00	0.019	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Sn-113 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0115	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	14913-50-9	Thallium-208	SOIL	LA-508-462		0.182	pCi/g	1.00	0.016	09/10/03	04/04/03	08/27/03
W030000733	B16RX8 DUP 20030461	E,T,C	Tl-208 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0295	pCi/g	1.00	0.0	09/10/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14596-10-2	Americium-241	SOIL	LA-508-462	U	0.895	pCi/g	1.00	0.24	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Am-241 Rel Count Error (GEA)	SOIL	LA-508-462		+- 0.181	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14234-35-6	Antimony-125	SOIL	LA-508-462	U	0.0132	pCi/g	1.00	0.039	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Sb-125 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0235	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14762-78-8	Cerium-144	SOIL	LA-508-462	U	5.52e-03	pCi/g	1.00	0.16	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Ce-144 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0552	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	10198-40-0	Cobalt-60	SOIL	LA-508-462	U	-4.55e-03	pCi/g	1.00	0.012	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Co-60 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 7.10e-03	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	13967-70-9	Cesium-134	SOIL	LA-508-462	U	0.0294	pCi/g	1.00	0.017	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Cs-134 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0141	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	10045-97-3	Cesium-137	SOIL	LA-508-462	U	-5.93e-03	pCi/g	1.00	0.014	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Cs-137 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 8.66e-03	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03

0000179

MDL=Minimum Detection Limit U - Analyzed for but not detected above limiting criteria.
RQ=Result Qualifier

10/23/03

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report WGPP/ver. 1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2-8

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20031181

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000734	B16RX9 DUP 20030461	14683-23-9	Europium-152	SOIL	LA-508-462	U	-0.0297	pCi/g	1.00	0.044	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Eu-152 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0440	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	15585-10-1	Europium-154	SOIL	LA-508-462	U	-4.51e-03	pCi/g	1.00	0.037	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Eu-154 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0221	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14391-16-3	Europium-155	SOIL	LA-508-462	U	0.0588	pCi/g	1.00	0.10	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Eu-155 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0606	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14681-63-1	Niobium-94	SOIL	LA-508-462	U	7.31e-03	pCi/g	1.00	0.014	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Nb-94 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 7.97e-03	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	13982-63-3	Radium-226	SOIL	LA-508-462	J	0.372	pCi/g	1.00	0.028	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Ra-226 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0565	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	15262-20-1	Radium-228	SOIL	LA-508-462		0.515	pCi/g	1.00	0.043	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Ra-228 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0824	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	13967-48-1	Ruthenium-106	SOIL	LA-508-462	U	-0.0290	pCi/g	1.00	0.12	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Ru-106 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0734	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	15832-50-5	Tin-126	SOIL	LA-508-462	U	-0.0238	pCi/g	1.00	0.11	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Sn-126 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.119	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	15065-10-8	Thorium-234	SOIL	LA-508-462		37.3	pCi/g	1.00	1.7	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Th-234 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 4.33	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	15117-96-1	Uranium-235	SOIL	LA-508-462		0.618	pCi/g	1.00	0.16	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	U-235 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.139	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	13982-39-3	Zinc-65	SOIL	LA-508-462	U	0.0132	pCi/g	1.00	0.029	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Zn-65 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0191	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14331-83-0	Actinium-228	SOIL	LA-508-462		0.515	pCi/g	1.00	0.043	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Ac-228 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0824	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14913-49-6	Bismuth-212	SOIL	LA-508-462		0.316	pCi/g	1.00	0.11	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Bi-212 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.106	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14733-03-0	Bismuth-214	SOIL	LA-508-462	J	0.372	pCi/g	1.00	0.028	09/08/03	04/04/03	08/27/03

0020000

MDL=Minimum Detection Limit U - Analyzed for but not detected above limiting criteria.
RQ=Result Qualifier

10/23/03 K

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF
ANALYTICAL RESULTS REPORT

2-9

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20031181

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000734	B16RX9 DUP 20030461	E,T,C	Bi-214 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0565	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	15092-94-1	Lead-212	SOIL	LA-508-462		0.558	pCi/g	1.00	0.031	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Pb-212 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0564	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	15067-28-4	Lead-214	SOIL	LA-508-462		0.426	pCi/g	1.00	0.032	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Pb-214 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0515	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	13968-53-1	Ruthenium-103	SOIL	LA-508-462	U	-1.62e-03	pCi/g	1.00	0.013	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Ru-103 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 8.18e-03	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	13966-06-8	Tin-113	SOIL	LA-508-462	U	1.18e-03	pCi/g	1.00	0.018	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Sn-113 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0118	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	14913-50-9	Thallium-208	SOIL	LA-508-462		0.169	pCi/g	1.00	0.014	09/08/03	04/04/03	08/27/03
W030000734	B16RX9 DUP 20030461	E,T,C	Tl-208 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0265	pCi/g	1.00	0.0	09/08/03	04/04/03	08/27/03
W030000735	B16RY0 DUP 20030470	14596-10-2	Americium-241	SOIL	LA-508-462	U	0.0543	pCi/g	1.00	0.18	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	E,T,C	Am-241 Rel Count Error (GEA)	SOIL	LA-508-462		+- 0.112	pCi/g	1.00	0.0	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	14234-35-6	Antimony-125	SOIL	LA-508-462	U	-4.34e-03	pCi/g	1.00	0.055	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	E,T,C	Sb-125 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0333	pCi/g	1.00	0.0	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	14762-78-8	Cerium-144	SOIL	LA-508-462	U	0.0157	pCi/g	1.00	0.13	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	E,T,C	Ce-144 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0801	pCi/g	1.00	0.0	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	10198-40-0	Cobalt-60	SOIL	LA-508-462	U	3.76e-03	pCi/g	1.00	0.028	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	E,T,C	Co-60 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0157	pCi/g	1.00	0.0	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	13967-70-9	Cesium-134	SOIL	LA-508-462	U	0.0498	pCi/g	1.00	0.031	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	E,T,C	Cs-134 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0278	pCi/g	1.00	0.0	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	10045-97-3	Cesium-137	SOIL	LA-508-462	U	3.13e-04	pCi/g	1.00	0.025	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	E,T,C	Cs-137 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 3.13e-03	pCi/g	1.00	0.0	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	14683-23-9	Europium-152	SOIL	LA-508-462	U	8.12e-03	pCi/g	1.00	0.055	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	E,T,C	Eu-152 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0548	pCi/g	1.00	0.0	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	15585-10-1	Europium-154	SOIL	LA-508-462	U	8.56e-03	pCi/g	1.00	0.083	09/08/03	04/07/03	08/27/03
W030000735	B16RY0 DUP 20030470	E,T,C	Eu-154 Rel. Count Error (GEA)	SOIL	LA-508-462		+- 0.0489	pCi/g	1.00	0.0	09/08/03	04/07/03	08/27/03

0100021

MDL=Minimum Detection Limit U - Analyzed for but not detected above limiting criteria.
RQ=Result Qualifier

10/23/03

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report WGPP/ver. 1
Ground Water Protection Program

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Sample Delivery Group	**WSCF20030461**
Sample Matrix	**Soil**
Sample Visual	**Brown**
SAF Number	**F03-006**
Data Deliverable	**Summary Report**

Introduction

Two (2) soil samples (B16RX8, B16RX9) from the GPP was received at the WSCF Laboratory on April 4, 2003. The sample was analyzed for those analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Groundwater Protection Program- Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information. Copies of the chain of custody and Request for Sample Analysis forms are included as Attachment 3.

Analytical Methodology for Requested Analyses

- ICP-MS Metals by EPA Method 200.8 and ICP-AES Metals by EPA SW-846 Method 6010A. Analytical work was performed with no deviations to the approved method.
- VOA's by EPA SW-846 Method 8260A. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under EPA SW-846 Method 8015 was reported under this method.
- Semi-VOA's by EPA SW-846 Method 8270B. Analytical work was performed with no deviations to the approved method.
- Alcohols and Glycols by EPA SW-846 Method 8015. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under this method was reported under EPA SW-846 Method 8260A.
- WTPH-D by WDOE Method NWTPH-Dx. Analytical work was performed with no deviations to the approved method.
- WTPH-G by WDOE Method NWTPH-Gx. Analytical work was performed with no deviations to the approved method.

- IC Anions and Ammonium by EPA SW-846 Method 300.0 and 300.7. Analytical work was performed with no deviations to the approved method for Ammonium, but a deviation was required for the Anions (see comments below).

- The pH by EPA Method 150.1. Analytical work was performed with no deviations to the approved method.

- Percent Solids by EPA Method 160.3. Analytical work was performed with no deviations to the approved method.

- Cyanide by EPA SW-846 Method 9010. Analytical work was performed with no deviations to the approved method.

- All RadChem analyses (TA/TB, AEA's, GEA) were run by internal WDOE accredited WSCF procedures. Analytical work was performed with no deviations to the approved method.

Comments

PCB's – This analysis was originally on the Sample Chain of Custody when received at the WSCF Laboratory, but the client later requested the analysis not be run.

ICP-MS and ICP-AES Metals – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-27, 2-28, 2-29, 2-30, and 2-48 for QC details.

VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-36, 2-37 and 2-38 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Semi-VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-44, 2-45, 2-46 and 2-47 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Alcohols and Glycols – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-37 for QC details.

WTPH-D – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-40 for details.

WTPH-G – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-39 for details.

IC Anions – The client requested hold time(s) for this analysis was not met. The client was notified and requested WSCF to continue with this analysis. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-33, 2-34 and 2-36 for QC details.

NH4 – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-38 for QC details.

The pH – Per the direction of the chain of custody, the pH was completed within 24 hours of sampling.

Percent Solids – PCB's, VOA's, Semi-VOA's, Alcohols and Glycols, WTPH-G and WTPH-D analytical results were corrected for percent solids. All other analytical results were reported for the sample as received.

CN – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-26 for QC details.

RadChem – There are no hold times associated with these WDOE accredited methods. Except for GEA, a Laboratory Control Sample and Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-31, 2-32, and 2-35 for QC details.

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.

Troy Dale
WSCF Production Control

Abbreviations

Hg – mercury
IC – ion chromatography
ICP – inductively coupled plasma
ICP/AES – ICP/atomic emission spectroscopy
ICP/MS – ICP/mass spectrometry
Total U – total uranium
AT/TB – total alpha/total beta
AEA – Alpha Energy Analysis
WTPH-G – Total Hydrocarbons-Gasoline
Am – americium
Cm - curium
Pu – plutonium
Np – neptunium
GEA – gamma energy analysis
H3 – Tritium
Sr – Strontium 89, 90
WTPH-D – Total Hydrocarbons-Diesel
TSS – Total Suspended Solids

Customer Sample Number	Original Sample Delivery Group
B16RX6	WSCF20030459
B16RX7	WSCF20030460
B16RX8	WSCF20030461
B16RX9	WSCF20030461
B16RY0	WSCF20030470
B16RY1	WSCF20030470
B16RY2	WSCF20030470
B16RY3	WSCF20030492
B16RY4	WSCF20030515
B16RY5	WSCF20030524
B16VV9	WSCF20030524

Introduction

GPP requested WSCF correct exponent issues associated with Cesium-134 for B16RX6 (WSCF sample number W030000731) and Americium-241for B16RX8 (WSCF sample number W030000733). The original report was issued on September 18, 2003 under letter number T4180-03-SLF-036). These issues have been corrected and are contained in the attached report.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information.

Analytical Methodology for Requested Analyses

- The GEA analysis was run by internal WDOE accredited WSCF procedures. Analytical work was performed with no deviations to the approved method.

Comments

RadChem – There are no hold times associated with this WDOE accredited method. A Laboratory Control Sample, Blank and Duplicate (per agreement with the client, the duplicate is a recount of one the samples in the batch) were analyzed with this assigned delivery group. See page(s) 2-27, and 2-28 for QC details. The upper and lower limits for the BLANK (page 2-28) have been established as starting points for the GEA analysis. As more analyses are run, these limits will be adjusted.

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.

Troy Dale
WSCF Production Control

Abbreviations

Hg – mercury
IC – ion chromatography
ICP – inductively coupled plasma
ICP/AES – ICP/atomic emission spectroscopy
ICP/MS – ICP/mass spectrometry
Total U – total uranium
AT/TB – total alpha/total beta
AEA – Alpha Energy Analysis
WTPH-G – Total Hydrocarbons-Gasoline
Am – americium
Cm - curium
Pu – plutonium
Np – neptunium
GEA – gamma energy analysis
H3 – Tritium
Sr – Strontium 89, 90
WTPH-D – Total Hydrocarbons-Diesel
TSS – Total Suspended Solids

5/5/03

3-3

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-014	Page 1 of 1

Collector Johansen/Pope/Pfister	Company Contact LC Hulstrom Telephone No. 373-3928	Project Coordinator TRENT, SJ	Price Code 8N Data Turnaround 30 Days
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location 216-A-19 (C3245) 22.5-25.0 ft	SAF No. F03-006	Air Quality ☐
Ice Chest No. SMC-69	Field Logbook No. HNF-N-3361 COA 117504ES10	Method of Shipment Government Vehicle	
Shipped To Waste Sampling & Characterization	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000028

Preservation	Cool 4C	Cool 4C	None	None
Type of Container	aG	Gs*	P	Snap Vial
No. of Container(s)	1	3	1	1
Volume	250mL	40mL	500mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Activity Scan

2003046l

Sample No.	Matrix *	Sample Date	Sample Time				
B16RX8 W03020159	SOIL	4-4-03	1348	X	X	X	X
B16RX9 W03020160	SOIL	4-4-03	1348	X	X	X	X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature]	4/4/03 1450	[signature]	4/4/03 1450

SPECIAL INSTRUCTIONS

** The laboratory is to report both kerosene and diesel range compounds from the WTPH-D analysis.

(1) Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G; PCBs - 8082
(2) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(3) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134, Tin-126}; Isotopic Radium {Radium-226, Radium-228}; Isotopic Plutonium; Americium-241; Isotopic Uranium; Trace Elements ICP/MS - 200.8 (Complete) {Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Uranium}; ICP Metals - 6010A (Add-on) {Bismuth, Boron}; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; Cyanide (Total) - 335.2; Cations (IC) - 300.7 {Nitrogen in ammonium}; pH (Soil) - 9045

Matrix *
S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-PW-2/200-PW-4			DATA PACKAGE: WSCF200304G1		
VALIDATOR: TCI		LAB:		DATE: 10/18/05	
CASE:			SDG: 30461		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			
SAMPLES/MATRIX					
B16RY8 B16RY9					
					Soil

1. Completeness ..... ☐ N/A

Technical verification forms present? ..... Yes No N/A

Comments: _____

2. Initial Calibration (Levels D, E) ..... ☐ N/A

Instruments/detectors calibrated? ..... Yes No N/A

Initial calibration acceptable? ..... Yes No N/A

Standards NIST traceable? ..... Yes No N/A

Appendix A – Radiochemical Data Validation Checklist

Standards Expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

3. Continuing Calibration (Levels D, E) ..... ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

Calibration check acceptable? ..... Yes No N/A

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

000031

Appendix A – Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... Yes No N/A
Method blank results acceptable? ..... Yes No N/A
Analytes detected in method blank? ..... Yes No N/A
Field blank(s) analyzed? ..... Yes No N/A
Field blank results acceptable? ..... Yes No N/A
Analytes detected in field blank(s)? ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: Bismuth-214 Ra-226 – in blank - J
Lead 214 - J Ra-226

No FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A
LCS/BSS recoveries acceptable? ..... Yes No N/A
LCS/BSS traceable? (Levels D,E) ..... Yes No N/A
LCS/BSS expired? (Levels D,E) ..... Yes No N/A
LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments:

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☐ N/A

Chemical carrier added? ..... Yes No N/A
Chemical recovery acceptable? ..... Yes No N/A
Chemical carrier traceable? (Levels D, E) ..... Yes No N/A

Appendix A – Radiochemical Data Validation Checklist

Chemical carrier expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

Tracer traceable? (Levels D, E) ..... Yes No N/A

Tracer expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

9. Matrix Spikes (Levels C, D, E) ..... ☐ N/A

Matrix spike analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Spike source traceable? (Levels D, E) ..... Yes No N/A

Spike source expired? Levels D, E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

10. Duplicates (Levels C, D, E) ..... ☐ N/A

Duplicates Analyzed at required frequency? ..... Yes No N/A

RPD Values Acceptable? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

11. Field QC Samples (Levels C, D E) ..... ☐ N/A

Field duplicate sample(s) analyzed? ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split sample(s) analyzed? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: _____

12. Holding Times (All levels)

Are sample holding times acceptable? ..... Yes No N/A

Comments: _____

13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses? Yes No N/A

Results supported in raw data?(Levels D, E) Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments:

Appendix 6

Additional Documentation Requested by Client

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: Americium by AEA

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit	
Lab ID: W030000159								
BATCH QC ASSOCIATED WITH SAMPLE								
DUP	Am-241 by AEA	14596-10-2	11.111	RPD	04/18/03	0.000	20.000	
BATCH QC								
BLANK	Am-241 by AEA	14596-10-2	-3.4e-02	PCG	04/18/03	0.000	1000.000	*
LCS	Am-241 by AEA	14596-10-2	97.000	% Recov	04/18/03	75.000	125.000	

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: Plutonium Isotopics by AEA

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
DUP	Pu-239/240 by AEA	PU-239/240	72.401	RPD	04/17/03	0.000	20.000
BATCH QC							
BLANK	Pu-239/240 by AEA	PU-239/240	3.5e-02	PCG	04/17/03	0.000	1000.000
LCS	Pu-239/240 by AEA	PU-239/240	106.000	% Recov	04/17/03	75.000	125.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: Uranium Isotopics by AEA

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000157							
BATCH QC ASSOCIATED WITH SAMPLE							
DUP	U-238 by AEA	24678-82-8	8.163	RPD	04/28/03	0.000	20.000
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
DUP	U-238 by AEA	24678-82-8	11.321	RPD	04/28/03	0.000	20.000
BATCH QC							
BLANK	U-238 by AEA	24678-82-8	1.6e-02	PCG	04/28/03	0.000	1000.000
LCS	U-238 by AEA	24678-82-8	113.000	% Recov	04/28/03	75.000	125.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20031181
Matrix: SOLID
Test: Gamma Energy Analysis-grd H2O

SAF Number: F03-006
Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
BATCH QC									
BLANK	Actinium-228	14331-83-0	4.48e-02	0.045	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Americium-241	14596-10-2	U-6.86e-2	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Bismuth-212	14913-49-6	U9.23e-03	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Bismuth-214	14733-03-0	1.07e-01	0.107	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Cerium-144	14762-78-8	U-3.17e-2	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Cobalt-60	10198-40-0	U2.58e-03	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Cesium-134	13967-70-9	U1.17e-03	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Cesium-137	10045-97-3	U-8.55e-3	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Europium-152	14683-23-9	U3.28e-03	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Europium-154	15585-10-1	U-2.86e-2	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Europium-155	14391-16-3	U7.27e-03	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Niobium-94	14681-63-1	U1.44e-03	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Lead-212	15092-94-1	U1.10e-02	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Lead-214	15067-28-4	9.20e-02	0.092	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Radium-226	13982-63-3	1.07e-01	0.107	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Radium-228	15262-20-1	4.48e-02	0.045	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Ruthenium-103	13968-53-1	U-5.20e-4	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Ruthenium-106	13967-48-1	U-1.97e-2	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Antimony-125	14234-35-6	U-9.06e-3	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Tin-113	13966-06-8	U-7.66e-3	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Tin-126	15832-50-5	U9.17e-04	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Thorium-234	15065-10-8	U1.42e-01	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Thallium-208	14913-50-9	U-4.37e-3	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Uranium-235	15117-96-1	U-1.68e-2	n/a	pCi/g	09/08/03	-10000.000	1000.000	
BLANK	Zinc-65	13982-39-3	U2.23e-03	n/a	pCi/g	09/08/03	-10000.000	1000.000	
LCS	Americium-241	14596-10-2	4.16e+03	106.122	% Recov	09/04/03	80.000	120.000	
LCS	Cobalt-60	10198-40-0	4.43e+03	105.728	% Recov	09/04/03	80.000	120.000	
LCS	Cesium-137	10045-97-3	3.88e+03	108.380	% Recov	09/04/03	80.000	120.000	

WSCF ANALYTICAL LABORATORY QC REPORT

2 - 27

SDG Number: WSCF20031181
Matrix: SOLID
Test: Gamma Energy Analysis-grd H2O

SAF Number: F03-006
Sample Date:
Receive Date:08/27/03

Lab ID: W030000741
BATCH QC ASSOCIATED WITH SAMPLE

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
DUP	Actinium-228	14331-83-0	5.96e-01	11.160	RPD	09/08/03	0.000	20.000	
DUP	Americium-241	14596-10-2	U-1.66e-1	n/a	RPD	09/08/03	0.000	20.000	
DUP	Bismuth-212	14913-49-6	3.95e-01	29.318	RPD	09/08/03	0.000	20.000	
DUP	Bismuth-214	14733-03-0	3.51e-01	2.890	RPD	09/08/03	0.000	20.000	
DUP	Cerium-144	14762-78-8	U2.07e-02	n/a	RPD	09/08/03	0.000	20.000	
DUP	Cobalt-60	10198-40-0	U4.28e-03	n/a	RPD	09/08/03	0.000	20.000	
DUP	Cesium-134	13967-70-9	U1.73e-02	n/a	RPD	09/08/03	0.000	20.000	
DUP	Cesium-137	10045-97-3	4.11e-02	21.265	RPD	09/08/03	0.000	20.000	
DUP	Europium-152	14683-23-9	U9.81e-03	n/a	RPD	09/08/03	0.000	20.000	
DUP	Europium-154	15585-10-1	U-1.56e-2	n/a	RPD	09/08/03	0.000	20.000	
DUP	Europium-155	14391-16-3	U-1.68e-2	n/a	RPD	09/08/03	0.000	20.000	
DUP	Niobium-94	14681-63-1	U2.23e-03	n/a	RPD	09/08/03	0.000	20.000	
DUP	Lead-212	15092-94-1	6.48e-01	7.859	RPD	09/08/03	0.000	20.000	
DUP	Lead-214	15067-28-4	4.34e-01	7.111	RPD	09/08/03	0.000	20.000	
DUP	Radium-226	13982-63-3	3.51e-01	2.890	RPD	09/08/03	0.000	20.000	
DUP	Radium-228	15262-20-1	5.96e-01	11.160	RPD	09/08/03	0.000	20.000	
DUP	Ruthenium-103	13968-53-1	U2.10e-03	n/a	RPD	09/08/03	0.000	20.000	
DUP	Ruthenium-106	13967-48-1	U-5.73e-2	n/a	RPD	09/08/03	0.000	20.000	
DUP	Antimony-125	14234-35-6	U-1.99e-2	n/a	RPD	09/08/03	0.000	20.000	
DUP	Tin-113	13966-06-8	U1.36e-02	n/a	RPD	09/08/03	0.000	20.000	
DUP	Tin-126	15832-50-5	U6.62e-02	n/a	RPD	09/08/03	0.000	20.000	
DUP	Thorium-234	15065-10-8	U9.45e-02	n/a	RPD	09/08/03	0.000	20.000	
DUP	Thallium-208	14913-50-9	1.64e-01	6.289	RPD	09/08/03	0.000	20.000	
DUP	Uranium-235	15117-96-1	U9.10e-02	n/a	RPD	09/08/03	0.000	20.000	
DUP	Zinc-65	13982-39-3	U1.81e-02	n/a	RPD	09/08/03	0.000	20.000	

000041

Date: 17 November 2003
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling
Subject: Wet Chemistry - Data Package No. WSCF20030461 (SDG No. 30461)

INTRODUCTION

This memo presents the results of data validation on Data Package No. 30461 prepared by WSCF. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16RX8	4/4/03	Soil	C	See note 1 & 2
B16RX9	4/4/03	Soil	C	See note 1 & 2

1 - Ammonia - 350.3; pH - 9040A; IC anions - 300.0; cyanide - 9010B.
2 - Phosphate, nitrate and nitrite were not validated per FHI request..

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times/Sample Preservation**

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for ammonia, chloride, fluoride and sulfate; 14 days for cyanide; 2 days for phosphate; and immediate (24 hours) for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and

"UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".

Due to the samples not being properly preserved (cooled to 4° C), the cyanide and ammonia results were qualified as estimates and flagged "J".

All other holding times were acceptable.

- **Method Blanks**

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike and LCS recoveries must fall within the range of 75% to 125%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 31.2% and a matrix spike duplicate recovery of 21.9%, the ammonia result was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 127%, all fluoride results were qualified as estimates and flagged "J".

All other matrix spike and LCS recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 35%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (38%), all ammonia results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (69%), all fluoride results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the target quantitation limits (TQLs) to ensure that laboratory detection levels meet the required criteria. All results met the TQL.

- **Completeness**

Data package No. 30461 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J". Due to the samples not being properly preserved (cooled to 4° F), the cyanide and ammonia results were qualified as estimates and flagged "J". Due to a matrix spike recovery of 127%, all fluoride results were qualified as estimates and flagged "J". Due to a matrix spike recovery of 31.2% and a matrix spike duplicate recovery of 21.9%, the ammonia result was qualified as an estimate and flagged "J". Due to an RPD outside QC limits (38%), all ammonia results were qualified as estimates and flagged "J". Due to an RPD outside QC limits (69%), all fluoride results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with FHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: 30461	REVIEWER: TLI	DATE: 11/17/03	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Ammonia Fluoride	J	All	RPD
Ammonia Fluoride	J	All	MS/MSD recovery
pH	J	All	Holding tme
Cyanide Ammonia	J	All	Sample preservation

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: FLUOR-HANFORD									
Laboratory: WSCF									
Case	SDG: WSCF20030461								
Sample Number		B16RX8		B16RX9					
"									
Location									
Sample Date		4/4/03		4/4/03					
Wet Chemistry	TQL	Result	Q	Result	Q	Result	Q	Result	Q
Ammonia	0.5	6.22	J	6.79	J				
Cyanide	0.5	<0.200	UJ	<0.200	UJ				
pH**		9.60	J	9.59	J				
Bromide		<0.900	U	<0.855	U				
Chloride	2	20.7		19.4					
Fluoride	5	0.981	J	1.03	J				
Nitrate*	2.5	447		415					
Nitrite*	2.5	0.451		0.406					
Phosphate*	5	4.33		5.04					
Sulfate	5	118		114					
* - Not validated per FHI request									
** - units are pH units									
NA = Not analyzed									

000010

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

WSCF
ANALYTICAL RESULTS REPORT

2-3

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	7664-41-7	Ammonia (N) by IC	SOLID	LA-503-401		6.22 J	ug/g	50.00	0.20	04/23/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	57-12-5	Cyanide by Midi/Spectrophotom	SOLID	LA-695-402	U	< 0.200 J	mg/kg	0.98	0.20	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	TS	Percent Solids	SOLID	LA-519-412		94.1	%		0.0	04/22/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	PH	pH Soil and Waste Measurement	SOLID	LA-212-411		9.60 J	pH		0.010	04/22/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	12587-46-1	Alpha by liquid scintillation	SOLID	LA-508-421		12.0	pCi/g		1.7	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP		Alpha error by LC	SOLID	LA-508-421		41.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	12587-47-2	Beta by liquid scintillation	SOLID	LA-508-421		35.0	pCi/g		3.1	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP		Beta error by LC	SOLID	LA-508-421		30.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	540-51-2	2-Bromoethanol	SOLID	Organics		1.40e+04	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	60-29-7	Diethyl ether	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	107-21-1	Ethylene glycol	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	67-56-1	Methanol	SOLID	Organics	U	< 1.00e+03	ug/kg		1.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14596-10-2	Am-241 by AEA	SOLID	LA-508-471	U	0.170	pCi/g		0.26	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Am-241 by AEA Total Cntg Error	SOLID	LA-508-471		98.0	%		0.0	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	24959-67-9	Bromide (Br) by IC	SOLID	LA-533-410	U	< 0.900	ug/g	20.00	0.90	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	16887-00-6	Chloride (Cl) by IC	SOLID	LA-533-410		20.7	ug/g	20.00	0.28	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	16984-48-8	Fluoride (F) by IC	SOLID	LA-533-410	BX	0.981 J	ug/g	20.00	0.14	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	NO3-N	Nitrate (N) by IC	SOLID	LA-533-410		447	ug/g	9.89e+002	4.9	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	NO2-N	Nitrite (N) by IC	SOLID	LA-533-410	B	0.451	ug/g	20.00	0.18	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14265-44-2	Phosphate (P) by IC	SOLID	LA-533-410	B	4.33	ug/g	20.00	0.26	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14808-79-8	Sulfate (SO4) by IC	SOLID	LA-533-410		118	ug/g	20.00	0.48	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Ac-228 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.8	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14331-83-0	Ac-228 by GEA	SOLID	LA-508-462		0.460	pCi/g		0.036	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Am-241 Rel.% Count Error (GEA)	SOLID	LA-508-462		23.4	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14596-10-2	Am-241 by GEA	SOLID	LA-508-462	U	0.726	pCi/g		0.22	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Bi-212 Rel.% Count Error (GEA)	SOLID	LA-508-462		33.6	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14913-49-6	Bi-212 by GEA	SOLID	LA-508-462		0.270	pCi/g		0.092	04/08/03	04/04/03	04/04/03

0000171

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
E - Analyte is an estimate, has potentially larger errors
J - Estimated Value
U - Analyzed for but not detected above limiting criteria.
X - Other flags and notes described in the comments/narrative.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

2-9

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4
Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	126-73-8	Tri-n-butylphosphate	SOLID	LA-523-456	J	94.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-44-4	bis(-2-Chloroethyl)Eth	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-91-1	bis(2-Chloroethoxy)methane	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13966-29-5	U-234 by AEA	SOLID	LA-508-471		3.60	pCi/g		0.099	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E.T.C	U-234 by AEA Total Cntg Error	SOLID	LA-508-471		22.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	15117-96-1	U-235 by AEA	SOLID	LA-508-471		0.420	pCi/g		0.093	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E.T.C	U-235 by AEA Total Cntg Error	SOLID	LA-508-471		38.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	24678-82-8	U-238 by AEA	SOLID	LA-508-471		28.0	pCi/g		0.067	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E.T.C	U-238 by AEA Total Cntg Error	SOLID	LA-508-471		19.0	%		0.10	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	75-35-4	1,1-Dichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-36-3	1-Butanol	SOLID	LA-523-455	U	< 21.0	ug/kg	1.00	21	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-43-2	Benzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-90-7	Chlorobenzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-88-3	Toluene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	79-01-6	Trichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	8008-20-6	Kerosene	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	68476-34-6	Total Pet. Hydrocarbons Diesel	SOLID	NWTPH	J	7.80e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	84-15-1	ortho-Terphenyl	SOLID	NWTPH		2.00e+04	ug/kg	1.00	2.1e+02	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7664-41-7	Ammonia (N) by IC	SOLID	LA-503-401		6.79	ug/g	50.00	0.20	04/23/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	57-12-5	Cyanide by Midi/Spectrophotom	SOLID	LA-695-402	U	< 0.200	mg/kg	0.99	0.20	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	TS	Percent Solids	SOLID	LA-519-412		94.1	%		0.0	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	PH	pH Soil and Waste Measurement	SOLID	LA-212-411		9.59	pH		0.010	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-46-1	Alpha by liquid scintillation	SOLID	LA-508-421		12.0	pCi/g		1.8	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Alpha error by LC	SOLID	LA-508-421		50.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-47-2	Beta by liquid scintillation	SOLID	LA-508-421		35.0	pCi/g		3.4	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Beta error by LC	SOLID	LA-508-421		31.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	540-51-2	2-Bromoethanol	SOLID	Organics		1.30e+04	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03

0000012

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.

E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

10/18/05

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4
Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	60-29-7	Diethyl ether	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	107-21-1	Ethylene glycol	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	67-56-1	Methanol	SOLID	Organics	U	< 1.00e+03	ug/kg		1.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14596-10-2	Am-241 by AEA	SOLID	LA-508-471	U	0.0210	pCi/g		0.31	04/18/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Am-241 by AEA Total Cntg Error	SOLID	LA-508-471		840	%		0.0	04/18/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	24959-67-9	Bromide (Br) by IC	SOLID	LA-533-410	U	< 0.855	ug/g	19.00	0.86	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	16887-00-6	Chloride (Cl) by IC	SOLID	LA-533-410		19.4	ug/g	19.00	0.27	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	16984-48-8	Fluoride (F) by IC	SOLID	LA-533-410	J	1.03	ug/g	19.00	0.13	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	NO3-N	Nitrate (N) by IC	SOLID	LA-533-410		415	ug/g	9.82e+002	4.9	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	NO2-N	Nitrite (N) by IC	SOLID	LA-533-410		0.406	ug/g	19.00	0.17	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14265-44-2	Phosphate (P) by IC	SOLID	LA-533-410	J	6.04	ug/g	19.00	0.25	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14808-79-8	Sulfate (SO4) by IC	SOLID	LA-533-410		114	ug/g	19.00	0.46	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Ac-228 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.8	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14331-83-0	Ac-228 by GEA	SOLID	LA-508-462		0.429	pCi/g		0.037	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Am-241 Rel.% Count Error (GEA)	SOLID	LA-508-462		78.4	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14596-10-2	Am-241 by GEA	SOLID	LA-508-462	U	0.152	pCi/g		0.17	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Bi-212 Rel.% Count Error (GEA)	SOLID	LA-508-462		30.9	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14913-49-6	Bi-212 by GEA	SOLID	LA-508-462		0.288	pCi/g		0.093	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Bi-214 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.6	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14733-03-0	Bi-214 by GEA	SOLID	LA-508-462		0.362	pCi/g		0.023	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Ce-144 Rel.% Count Error (GEA)	SOLID	LA-508-462		392	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14762-78-8	Ce-144 by GEA	SOLID	LA-508-462	U	0.0198	pCi/g		0.12	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Co-60 Rel.% Count Error (GEA)	SOLID	LA-508-462		322	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	10198-40-0	Co-60 by GEA	SOLID	LA-508-462	U	1.96e-03	pCi/g		0.011	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Cs-134 Rel.% Count Error (GEA)	SOLID	LA-508-462		68.6	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13967-70-9	Cs-134 by GEA	SOLID	LA-508-462	U	0.0227	pCi/g		0.015	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Cs-137 Rel.% Count Error (GEA)	SOLID	LA-508-462		1.00e+03	%		0.0	04/09/03	04/04/03	04/04/03

MDL=Minimum Detection Limit
RQ=Result Qualifier
DF=Dilution Factor

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.

E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

10/14/03

- Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

0000013

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Sample Delivery Group	**WSCF20030461**
Sample Matrix	**Soil**
Sample Visual	**Brown**
SAF Number	**F03-006**
Data Deliverable	**Summary Report**

Introduction

Two (2) soil samples (B16RX8, B16RX9) from the GPP was received at the WSCF Laboratory on April 4, 2003. The sample was analyzed for those analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Groundwater Protection Program- Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information. Copies of the chain of custody and Request for Sample Analysis forms are included as Attachment 3.

Analytical Methodology for Requested Analyses

- ICP-MS Metals by EPA Method 200.8 and ICP-AES Metals by EPA SW-846 Method 6010A. Analytical work was performed with no deviations to the approved method.
- VOA's by EPA SW-846 Method 8260A. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under EPA SW-846 Method 8015 was reported under this method.
- Semi-VOA's by EPA SW-846 Method 8270B. Analytical work was performed with no deviations to the approved method.
- Alcohols and Glycols by EPA SW-846 Method 8015. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under this method was reported under EPA SW-846 Method 8260A.
- WTPH-D by WDOE Method NWTPH-Dx. Analytical work was performed with no deviations to the approved method.
- WTPH-G by WDOE Method NWTPH-Gx. Analytical work was performed with no deviations to the approved method.

- IC Anions and Ammonium by EPA SW-846 Method 300.0 and 300.7. Analytical work was performed with no deviations to the approved method for Ammonium, but a deviation was required for the Anions (see comments below).

- The pH by EPA Method 150.1. Analytical work was performed with no deviations to the approved method.

- Percent Solids by EPA Method 160.3. Analytical work was performed with no deviations to the approved method.

- Cyanide by EPA SW-846 Method 9010. Analytical work was performed with no deviations to the approved method.

- All RadChem analyses (TA/TB, AEA's, GEA) were run by internal WDOE accredited WSCF procedures. Analytical work was performed with no deviations to the approved method.

Comments

PCB's – This analysis was originally on the Sample Chain of Custody when received at the WSCF Laboratory, but the client later requested the analysis not be run.

ICP-MS and ICP-AES Metals – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-27, 2-28, 2-29, 2-30, and 2-48 for QC details.

VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-36, 2-37 and 2-38 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Semi-VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-44, 2-45, 2-46 and 2-47 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Alcohols and Glycols – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-37 for QC details.

WTPH-D – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-40 for details.

WTPH-G – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-39 for details.

IC Anions – The client requested hold time(s) for this analysis was not met. The client was notified and requested WSCF to continue with this analysis. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-33, 2-34 and 2-36 for QC details.

NH4 – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-38 for QC details.

The pH – Per the direction of the chain of custody, the pH was completed within 24 hours of sampling.

Percent Solids – PCB's, VOA's, Semi-VOA's, Alcohols and Glycols, WTPH-G and WTPH-D analytical results were corrected for percent solids. All other analytical results were reported for the sample as received.

CN – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-26 for QC details.

RadChem – There are no hold times associated with these WDOE accredited methods. Except for GEA, a Laboratory Control Sample and Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-31, 2-32, and 2-35 for QC details.

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.

Troy Dale
WSCF Production Control

Abbreviations

Hg – mercury
IC – ion chromatography
ICP – inductively coupled plasma
ICP/AES – ICP/atomic emission spectroscopy
ICP/MS – ICP/mass spectrometry
Total U – total uranium
AT/TB – total alpha/total beta
AEA – Alpha Energy Analysis
WTPH-G – Total Hydrocarbons-Gasoline
Am – americium
Cm - curium
Pu – plutonium
Np – neptunium
GEA – gamma energy analysis
H3 – Tritium
Sr – Strontium 89, 90
WTPH-D – Total Hydrocarbons-Diesel
TSS – Total Suspended Solids

5/5/03

3-3

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-014	Page 1 of 1
Collector: Johansen/Pope/Pfister	Company Contact: LC Hulstrom; Telephone No.: 373-3928	Project Coordinator: TRENT, SJ	Price Code 8N; Data Turnaround 30 Days
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: 216-A-19 (C3245) 22.5-25.0 ft	SAF No.: F03-006	Air Quality ☐
Ice Chest No.: SML-69	Field Logbook No.: HNF-N-3361; COA: 117504ES10	Method of Shipment: Government Vehicle	
Shipped To: Waste Sampling & Characterization	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000021

Preservation	Cool 4C	Cool 4C	None	None
Type of Container	aG	Gs*	P	Snap Vial
No. of Container(s)	1	3	1	1
Volume	250mL	40mL	500mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Activity Scan

2003046l

Sample No.	Matrix *	Sample Date	Sample Time	(1)	(2)	(3)	Activity Scan
B16RX8 W03020159	SOIL	4-4-03	1348	X	X	X	X
B16RX9 W03000160	SOIL	4-4-03	1348	X	X	X	X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Thomas Promitos [signature]	4/4/03 1420	[signature]	4/4/03 1450

SPECIAL INSTRUCTIONS

** The laboratory is to report both kerosene and diesel range compounds from the WTPH-D analysis.

(1) Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G; PCBs - 8082
(2) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(3) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134, Tin-126}; Isotopic Radium {Radium-226, Radium-228}; Isotopic Plutonium; Americium-241; Isotopic Uranium; Trace Elements ICP/MS - 200.8 (Complete) {Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Uranium}; ICP Metals - 6010A (Add-on) {Bismuth, Boron}; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; Cyanide (Total) - 335.2; Cations (IC) - 300.7 {Nitrogen in ammonium}; pH (Soil) - 9045

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

A-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-PW-2/200-PW-4			DATA PACKAGE: WSCF20030463		
VALIDATOR: TL		LAB: WSCF		DATE: 10/18/03	
CASE:			SDG: 30461		
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate	Cyanide	
	~~TPH/D+G 10/18~~				
SAMPLES/MATRIX					
B16RX8	B16RX9				
				Soil	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: _____

_____

_____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

_____

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) .... Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E) .... Yes No (N/A)
Laboratory blanks analyzed? .... (Yes) No N/A
Laboratory blank results acceptable? .... (Yes) No N/A
Field blanks analyzed? (Levels C, D, E) .... Yes (No) N/A
Field blank results acceptable? (Levels C, D, E) .... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) .... Yes No (N/A)
Comments: NO FB

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed? .... (Yes) No N/A
Spike recoveries acceptable? .... Yes (No) N/A
Sike standards NIST traceable? (Levels D, E) .... Yes No (N/A)
Spike standards expired? (Levels D, E) .... Yes No (N/A)
LCS/BSS samples analyzed? .... (Yes) ~~Yes No~~ N/A
LCS/BSS results acceptable? .... (Yes) No N/A
Standards traceable? (Levels D, E) .... Yes No (N/A)
Standards expired? (Levels D, E) .... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) .... Yes No (N/A)
Performance audit sample(s) analyzed? .... Yes (No) N/A
Performance audit sample results acceptable? .... Yes No (N/A)
Comments: MS - Fluoride 127% J NO PA
MS ammonia 31% J
~~Kerosene Diesel - NO MS J~~ 10/18/03
~~No Diesel LCS - J~~ 10/18/03

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	(Yes)	No	N/A
Duplicate results acceptable?	Yes	(No)	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
Field duplicate RPD values acceptable?	Yes	No	(N/A)
Field split RPD values acceptable?	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments: ammonia 38% RPD J
Fluoride 67% J all

6. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	(No)	N/A
Sample holding times acceptable?	Yes	(No)	N/A

Comments: pH - over 2X the limit - J
preservation - no cooling J ammonia + cyanide

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Rresults supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

Appendix 6

Additional Documentation Requested by Client

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: Cyanide by Midi/Spectrophotom

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	Cyanide by Midi/Spectrophotom	57-12-5	108.000	% Recov	04/15/03	75.000	125.000
MSD	Cyanide by Midi/Spectrophotom	57-12-5	96.700	% Recov	04/15/03	75.000	125.000
SPK-RPD	Cyanide by Midi/Spectrophotom	57-12-5	11.041	Ratio	04/15/03	0.000	20.000
BATCH QC							
BLANK	Cyanide by Midi/Spectrophotom	57-12-5	0	Ratio	04/15/03	-2.000	2.000
BLNK-PREP	Cyanide by Midi/Spectrophotom	57-12-5	0	Ratio	04/15/03	-4.000	4.000
DUP	Cyanide by Midi/Spectrophotom	57-12-5	n/a	Ratio	04/15/03	0.000	20.000
LCS	Cyanide by Midi/Spectrophotom	57-12-5	97.500	% Recov	04/15/03	90.000	110.000
LCS-2	Cyanide by Midi/Spectrophotom	57-12-5	n/a	% Recov	04/15/03	80.000	120.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: Anions by Ion Chromatography

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
DUP	Bromide (Br) by IC	24959-67-9	n/a	RPD	04/09/03	0.000	20.000
DUP	Chloride (Cl) by IC	16887-00-6	4.950	RPD	04/09/03	0.000	20.000
DUP	Fluoride (F) by IC	16984-48-8	69.244	RPD	04/09/03	0.000	20.000 *
DUP	Nitrite (N) by IC	NO2-N	1.758	RPD	04/09/03	0.000	20.000
DUP	Nitrate (N) by IC	NO3-N	5.863	RPD	04/09/03	0.000	20.000
DUP	Phosphate (P) by IC	14265-44-2	1.376	RPD	04/09/03	0.000	20.000
DUP	Sulfate (SO4) by IC	14808-79-8	2.575	RPD	04/09/03	0.000	20.000
MS	Bromide (Br) by IC	24959-67-9	91.457	% Recov	04/09/03	75.000	125.000
MS	Chloride (Cl) by IC	16887-00-6	102.020	% Recov	04/09/03	75.000	125.000
MS	Fluoride (F) by IC	16984-48-8	127.198	% Recov	04/09/03	75.000	125.000 *
MS	Nitrite (N) by IC	NO2-N	97.817	% Recov	04/09/03	75.000	125.000
MS	Nitrate (N) by IC	NO3-N	112.332	% Recov	04/09/03	75.000	125.000
MS	Phosphate (P) by IC	14265-44-2	106.361	% Recov	04/09/03	75.000	125.000
MS	Sulfate (SO4) by IC	14808-79-8	119.289	% Recov	04/09/03	75.000	125.000
MSD	Bromide (Br) by IC	24959-67-9	91.457	% Recov	04/09/03	75.000	125.000
MSD	Chloride (Cl) by IC	16887-00-6	100.303	% Recov	04/09/03	75.000	125.000
MSD	Fluoride (F) by IC	16984-48-8	120.654	% Recov	04/09/03	75.000	125.000
MSD	Nitrite (N) by IC	NO2-N	96.230	% Recov	04/09/03	75.000	125.000
MSD	Nitrate (N) by IC	NO3-N	87.444	% Recov	04/09/03	75.000	125.000
MSD	Phosphate (P) by IC	14265-44-2	106.361	% Recov	04/09/03	75.000	125.000
MSD	Sulfate (SO4) by IC	14808-79-8	113.706	% Recov	04/09/03	75.000	125.000
BATCH QC							
BLANK	Bromide (Br) by IC	24959-67-9	<4.50e-2	mg/L	04/09/03	0.000	300.000
BLANK	Bromide (Br) by IC	24959-67-9	<4.50e-2	mg/L	04/09/03	0.000	300.000
BLANK	Chloride (Cl) by IC	16887-00-6	<1.40e-2	mg/L	04/09/03	0.000	300.000
BLANK	Chloride (Cl) by IC	16887-00-6	<1.40e-2	mg/L	04/09/03	0.000	300.000
BLANK	Fluoride (F) by IC	16984-48-8	<7.00e-3	mg/L	04/09/03	0.000	300.000
BLANK	Fluoride (F) by IC	16984-48-8	<7.00e-3	mg/L	04/09/03	0.000	300.000
BLANK	Nitrite (N) by IC	NO2-N	<9.00e-3	mg/L	04/09/03	0.000	300.000
BLANK	Nitrite (N) by IC	NO2-N	<9.00e-3	mg/L	04/09/03	0.000	300.000
BLANK	Nitrate (N) by IC	NO3-N	<5.00e-3	mg/L	04/09/03	0.000	300.000
BLANK	Nitrate (N) by IC	NO3-N	<5.00e-3	mg/L	04/09/03	0.000	300.000
BLANK	Phosphate (P) by IC	14265-44-2	<1.30e-2	mg/L	04/09/03	0.000	300.000
BLANK	Phosphate (P) by IC	14265-44-2	<1.30e-2	mg/L	04/09/03	0.000	300.000
BLANK	Sulfate (SO4) by IC	14808-79-8	<2.40e-2	mg/L	04/09/03	0.000	300.000
BLANK	Sulfate (SO4) by IC	14808-79-8	<2.40e-2	mg/L	04/09/03	0.000	300.000
LCS	Bromide (Br) by IC	24959-67-9	94.763	% Recov	04/09/03	80.000	120.000
LCS	Chloride (Cl) by IC	16887-00-6	96.000	% Recov	04/09/03	80.000	120.000
LCS	Fluoride (F) by IC	16984-48-8	98.480	% Recov	04/09/03	80.000	120.000
LCS	Nitrite (N) by IC	NO2-N	97.255	% Recov	04/09/03	80.000	120.000
LCS	Nitrate (N) by IC	NO3-N	93.230	% Recov	04/09/03	80.000	120.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: Anions by Ion Chromatography

SAF Number: F03-006
Sample Date:
Receive Date:

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
LCS	Phosphate (P) by IC	14265-44-2	99.587	% Recov	04/08/03	80.000	120.000
LCS	Sulfate (SO4) by IC	14808-79-8	97.995	% Recov	04/09/03	80.000	120.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: Ammonia (N) by IC

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit	
Lab ID: W030000159								
BATCH QC ASSOCIATED WITH SAMPLE								
DUP	Ammonia (N) by IC	7664-41-7	10.313	RPD	04/23/03	0.000	20.000	
MS	Ammonia (N) by IC	7664-41-7	31.273	% Recov	04/23/03	75.000	125.000	*
MSD	Ammonia (N) by IC	7664-41-7	21.939	% Recov	04/23/03	75.000	125.000	*
BATCH QC								
BLNK-PREP	Ammonia (N) by IC	7664-41-7	<4.00e-3	Ratio	04/23/03			
BLNK-PREP	Ammonia (N) by IC	7664-41-7	<4.00e-3	Ratio	04/23/03			
LCS	Ammonia (N) by IC	7664-41-7	99.638	% Recov	04/23/03	80.000	120.000	

Date: 17 November 2003
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling
Subject: Volatiles - Data Package No. WSCF20030461 (SDG No. 30461)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. 30461 prepared by WSCF. A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16RX8	4/4/03	Soil	C	See note 1
B16RX9	4/4/03	Soil	C	See note 1

1 - Volatiles by EPA 8260B and alcohols/glycols by 8015M.
2 - n-Butanol was analyzed by 8260A, not 8015M as requested by FHI. All other 8260A analytes were not validated per FHI request.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times/Sample Preservation**

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. samples must be analyzed within 14 days of the date of sample collection for VOAs and alcohols. If holding times are exceeded, but not by greater than twice the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If

non-detects. If holding times are exceeded by greater than twice the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the project quantitation limit (MDL) and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the MDL, qualified as undetected and flagged "U".

All method blank results were acceptable.

Field Blanks

No field duplicate samples were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike

Matrix spike/matrix spike duplicate and blank spike analyses are used to assess the analytical accuracy of the reported data. The matrix spike/matrix spike duplicate are used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within 70-130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All MS/MSD and blank spike results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

All surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Sample results must be within RPD limits of +/- 35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All MS/MSD RPD results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Detection Limits**

Reported analytical detection levels are compared against the target quantitation limits (TQLs) to ensure that laboratory detection levels meet the required criteria. All analytes met the TQL.

- **Completeness**

Data package No. 30461 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: 30461	REVIEWER: TLI	DATE: 11/17/03	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

VOLATILE ORGANIC AND ALCOHOL/GLYCOL ANALYSIS, WATER MATRIX, (UG/KG)

Project: FLUOR-HANFORD																	
Laboratory: WSCF																	
Case:	SDG: WSCF20030461																
Sample Number		B16RX8		B16RX9													
Remarks																	
Sample Date		04/04/03		04/04/03													
Analysis Date		04/16/03		04/16/03													
VOA/Alcohols	TQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1-Dichloroethene*	10	<2.10	U	<2.00	U												
1-Butanol	5000	<21.0	U	<20.00	U												
Benzene*	5	<2.10	U	<2.00	U												
Chlorobenzene*	5	<2.10	U	<2.00	U												
Toluene*	5	<2.10	U	<2.00	U												
Trichloroethene*		<2.10	U	<2.00	U												
2-Bromoethanol		14000		13000													
Diethyl ether		<5000	U	<5000	U												
Ethylene glycol	5000	<5000	U	<5000	U												
Methanol		<1000	U	<1000	U												
* - not validated per FHI request																	

000010

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation of results. All other qualifiers shown were applied during validation.

WSCF
ANALYTICAL RESULTS REPORT

2-9

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	126-73-8	Tri-n-butylphosphate	SOLID	LA-523-456	J	94.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-44-4	bis(-2-Chloroethyl)Eth	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-91-1	bis(2-Chloroethoxy)methane	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13966-29-5	U-234 by AEA	SOLID	LA-508-471		3.60	pCi/g		0.099	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-234 by AEA Total Cntg Error	SOLID	LA-508-471		22.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	15117-96-1	U-235 by AEA	SOLID	LA-508-471		0.420	pCi/g		0.093	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-235 by AEA Total Cntg Error	SOLID	LA-508-471		38.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	24678-82-8	U-238 by AEA	SOLID	LA-508-471		28.0	pCi/g		0.067	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-238 by AEA Total Cntg Error	SOLID	LA-508-471		19.0	%		0.10	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	75-35-4	1,1-Dichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-36-3	1-Butanol	SOLID	LA-523-455	U	< 21.0	ug/kg	1.00	21	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-43-2	Benzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-90-7	Chlorobenzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-88-3	Toluene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	79-01-6	Trichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	8008-20-6	Kerosene	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	68476-34-6	Total Pet. Hydrocarbons Diesel	SOLID	NWTPH	J	7.80e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	84-15-1	ortho-Terphenyl	SOLID	NWTPH		2.00e+04	ug/kg	1.00	2.1e+02	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7664-41-7	Ammonia (N) by IC	SOLID	LA-503-401		6.79	ug/g	50.00	0.20	04/23/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	57-12-5	Cyanide by Midi/Spectrophotom	SOLID	LA-695-402	U	< 0.200	mg/kg	0.99	0.20	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	TS	Percent Solids	SOLID	LA-519-412		94.1	%		0.0	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	PH	pH Soil and Waste Measurement	SOLID	LA-212-411		9.59	pH		0.010	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-46-1	Alpha by liquid scintillation	SOLID	LA-508-421		12.0	pCi/g		1.8	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Alpha error by LC	SOLID	LA-508-421		50.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-47-2	Beta by liquid scintillation	SOLID	LA-508-421		35.0	pCi/g		3.4	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Beta error by LC	SOLID	LA-508-421		31.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	540-51-2	2-Bromoethanol	SOLID	Organics		1.30e+04	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

10/15/03

WSCF
ANALYTICAL RESULTS REPORT

2-3

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4
Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	7664-41-7	Ammonia (N) by IC	SOLID	LA-503-401		6.22	ug/g	50.00	0.20	04/23/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	57-12-5	Cyanide by Midi/Spectrophotom	SOLID	LA-695-402	U	< 0.200	mg/kg	0.98	0.20	04/15/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	TS	Percent Solids	SOLID	LA-519-412		94.1	%		0.0	04/22/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	PH	pH Soil and Waste Measurement	SOLID	LA-212-411		9.60	pH		0.010	04/22/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	12587-46-1	Alpha by liquid scintillation	SOLID	LA-508-421		12.0	pCi/g		1.7	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP		Alpha error by LC	SOLID	LA-508-421		41.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	12587-47-2	Beta by liquid scintillation	SOLID	LA-508-421		35.0	pCi/g		3.1	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP		Beta error by LC	SOLID	LA-508-421		30.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	540-51-2	2-Bromoethanol	SOLID	Organics		1.40e+04	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	60-29-7	Diethyl ether	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	107-21-1	Ethylene glycol	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	67-56-1	Methanol	SOLID	Organics	U	< 1.00e+03	ug/kg		1.0e+03	05/02/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14596-10-2	Am-241 by AEA	SOLID	LA-508-471	U	0.170	pCi/g		0.26	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Am-241 by AEA Total Cntg Error	SOLID	LA-508-471		98.0	%		0.0	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	24959-67-9	Bromide (Br) by IC	SOLID	LA-533-410	U	< 0.900	ug/g	20.00	0.90	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	16887-00-6	Chloride (Cl) by IC	SOLID	LA-533-410		20.7	ug/g	20.00	0.28	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	16984-48-8	Fluoride (F) by IC	SOLID	LA-533-410	BX	0.981	ug/g	20.00	0.14	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	NO3-N	Nitrate (N) by IC	SOLID	LA-533-410		447	ug/g	9.89e+002	4.9	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	NO2-N	Nitrite (N) by IC	SOLID	LA-533-410	B	0.451	ug/g	20.00	0.18	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14265-44-2	Phosphate (P) by IC	SOLID	LA-533-410	B	4.33	ug/g	20.00	0.26	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14808-79-8	Sulfate (SO4) by IC	SOLID	LA-533-410		118	ug/g	20.00	0.48	04/09/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Ac-228 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.8	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14331-83-0	Ac-228 by GEA	SOLID	LA-508-462		0.460	pCi/g		0.036	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Am-241 Rel.% Count Error (GEA)	SOLID	LA-508-462		23.4	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14596-10-2	Am-241 by GEA	SOLID	LA-508-462	U	0.726	pCi/g		0.22	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	Bi-212 Rel.% Count Error (GEA)	SOLID	LA-508-462		33.6	%		0.0	04/08/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	14913-49-6	Bi-212 by GEA	SOLID	LA-508-462		0.270	pCi/g		0.092	04/08/03	04/04/03	04/04/03

0001212

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent **Group #:** WSCF20030461
Project: F03-006: 200-PW-2/PW-4

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000159	B16RX8	GPP	126-73-8	Tri-n-butylphosphate	SOLID	LA-523-456	J	94.0	ug/kg	1.00	71	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-44-4	bis(-2-Chloroethyl)Eth	SOLID	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	111-91-1	bis(2-Chloroethoxy)methane	SOLID	LA-523-456	U	< 120	ug/kg	1.00	1.2e+02	04/18/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	13966-29-5	U-234 by AEA	SOLID	LA-508-471		3.60	pCi/g		0.099	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-234 by AEA Total Cntg Error	SOLID	LA-508-471		22.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	15117-96-1	U-235 by AEA	SOLID	LA-508-471		0.420	pCi/g		0.093	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-235 by AEA Total Cntg Error	SOLID	LA-508-471		38.0	%		0.0	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	24678-82-8	U-238 by AEA	SOLID	LA-508-471		28.0	pCi/g		0.067	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	E,T,C	U-238 by AEA Total Cntg Error	SOLID	LA-508-471		19.0	%		0.10	04/28/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	75-35-4	1,1-Dichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-36-3	1-Butanol	SOLID	LA-523-455	U	< 21.0	ug/kg	1.00	21	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	71-43-2	Benzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-90-7	Chlorobenzene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	108-88-3	Toluene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	79-01-6	Trichloroethene	SOLID	LA-523-455	U	< 2.10	ug/kg	1.00	2.1	04/16/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	8008-20-6	Kerosene	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	68476-34-6	Total Pet. Hydrocarbons Diesel	SOLID	NWTPH	J	7.80e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000159	B16RX8	GPP	84-15-1	ortho-Terphenyl	SOLID	NWTPH		2.00e+04	ug/kg	1.00	2.1e+02	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	7664-41-7	Ammonia (N) by IC	SOLID	LA-503-401		6.79	ug/g	50.00	0.20	04/23/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	57-12-5	Cyanide by Midi/Spectrophotom	SOLID	LA-695-402	U	< 0.200	mg/kg	0.99	0.20	04/15/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	TS	Percent Solids	SOLID	LA-519-412		94.1	%		0.0	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	PH	pH Soil and Waste Measurement	SOLID	LA-212-411		9.59	pH		0.010	04/22/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-46-1	Alpha by liquid scintillation	SOLID	LA-508-421		12.0	pCi/g		1.8	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Alpha error by LC	SOLID	LA-508-421		50.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	12587-47-2	Beta by liquid scintillation	SOLID	LA-508-421		35.0	pCi/g		3.4	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP		Beta error by LC	SOLID	LA-508-421		31.0	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	540-51-2	2-Bromoethanol	SOLID	Organics		1.30e+04	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03

0000013

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
J - Estimated Value
X - Other flags and notes described in the comments/narrative.
E - Analyte is an estimate, has potentially larger errors
U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	60-29-7	Diethyl ether	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	107-21-1	Ethylene glycol	SOLID	Organics	U	< 5.00e+03	ug/kg		5.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	67-56-1	Methanol	SOLID	Organics	U	< 1.00e+03	ug/kg		1.0e+03	05/02/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14596-10-2	Am-241 by AEA	SOLID	LA-508-471	U	0.0210	pCi/g		0.31	04/18/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Am-241 by AEA Total Cntg Error	SOLID	LA-508-471		840	%		0.0	04/18/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	24959-67-9	Bromide (Br) by IC	SOLID	LA-533-410	U	< 0.855	ug/g	19.00	0.86	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	16887-00-6	Chloride (Cl) by IC	SOLID	LA-533-410		19.4	ug/g	19.00	0.27	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	16984-48-8	Fluoride (F) by IC	SOLID	LA-533-410		1.03	ug/g	19.00	0.13	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	NO3-N	Nitrate (N) by IC	SOLID	LA-533-410		415	ug/g	9.82e+002	4.9	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	NO2-N	Nitrite (N) by IC	SOLID	LA-533-410		0.406	ug/g	19.00	0.17	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14265-44-2	Phosphate (P) by IC	SOLID	LA-533-410		6.04	ug/g	19.00	0.25	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14808-79-8	Sulfate (SO4) by IC	SOLID	LA-533-410		114	ug/g	19.00	0.46	04/10/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Ac-228 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.8	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14331-83-0	Ac-228 by GEA	SOLID	LA-508-462		0.429	pCi/g		0.037	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Am-241 Rel.% Count Error (GEA)	SOLID	LA-508-462		78.4	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14596-10-2	Am-241 by GEA	SOLID	LA-508-462	U	0.152	pCi/g		0.17	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Bi-212 Rel.% Count Error (GEA)	SOLID	LA-508-462		30.9	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14913-49-6	Bi-212 by GEA	SOLID	LA-508-462		0.288	pCi/g		0.093	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Bi-214 Rel.% Count Error (GEA)	SOLID	LA-508-462		16.6	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14733-03-0	Bi-214 by GEA	SOLID	LA-508-462		0.362	pCi/g		0.023	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Ce-144 Rel.% Count Error (GEA)	SOLID	LA-508-462		392	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	14762-78-8	Ce-144 by GEA	SOLID	LA-508-462	U	0.0198	pCi/g		0.12	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Co-60 Rel.% Count Error (GEA)	SOLID	LA-508-462		322	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	10198-40-0	Co-60 by GEA	SOLID	LA-508-462	U	1.96e-03	pCi/g		0.011	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Cs-134 Rel.% Count Error (GEA)	SOLID	LA-508-462		68.6	%		0.0	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	13967-70-9	Cs-134 by GEA	SOLID	LA-508-462	U	0.0227	pCi/g		0.015	04/09/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	E,T,C	Cs-137 Rel.% Count Error (GEA)	SOLID	LA-508-462		1.00e+03	%		0.0	04/09/03	04/04/03	04/04/03

MDL=Minimum Detection Limit
RQ=Result Qualifier
DF=Dilution Factor

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
E - Analyte is an estimate, has potentially larger errors
J - Estimated Value
U - Analyzed for but not detected above limiting criteria.
X - Other flags and notes described in the comments/narrative.

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report W004/ver. 5.1
Ground Water Protection Program

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
Project: F03-006: 200-PW-2/PW-4

Group #: WSCF20030461

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
W030000160	B16RX9	GPP	75-35-4	1,1-Dichloroethene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	71-36-3	1-Butanol	SOLID	LA-523-455	U	< 20.0	ug/kg	1.00	20	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	71-43-2	Benzene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	108-90-7	Chlorobenzene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	108-88-3	Toluene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	79-01-6	Trichloroethene	SOLID	LA-523-455	U	< 2.00	ug/kg	1.00	2.0	04/16/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	8008-20-6	Kerosene	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	68476-34-6	Total Pet. Hydrocarbons Diesel	SOLID	NWTPH	U	< 4.20e+03	ug/kg	1.00	4.2e+03	05/01/03	04/04/03	04/04/03
W030000160	B16RX9	GPP	84-15-1	ortho-Terphenyl	SOLID	NWTPH		2.20e+04	ug/kg	1.00	2.1e+02	05/01/03	04/04/03	04/04/03

000014A

MDL=Minimum Detection Limit
RQ=Result Qualifier
DF=Dilution Factor

B - The analyte < the RDL but > = the IDL/MDL (inorganic)
E - Analyte is an estimate, has potentially larger errors
J - Estimated Value
U - Analyzed for but not detected above limiting criteria.
X - Other flags and notes described in the comments/narrative.

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 1
Narrative

Sample Delivery Group	**WSCF20030461**
Sample Matrix	**Soil**
Sample Visual	**Brown**
SAF Number	**F03-006**
Data Deliverable	**Summary Report**

Introduction

Two (2) soil samples (B16RX8, B16RX9) from the GPP was received at the WSCF Laboratory on April 4, 2003. The sample was analyzed for those analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Groundwater Protection Program- Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information. Copies of the chain of custody and Request for Sample Analysis forms are included as Attachment 3.

Analytical Methodology for Requested Analyses

- ICP-MS Metals by EPA Method 200.8 and ICP-AES Metals by EPA SW-846 Method 6010A. Analytical work was performed with no deviations to the approved method.
- VOA's by EPA SW-846 Method 8260A. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under EPA SW-846 Method 8015 was reported under this method.
- Semi-VOA's by EPA SW-846 Method 8270B. Analytical work was performed with no deviations to the approved method.
- Alcohols and Glycols by EPA SW-846 Method 8015. Analytical work was performed with no deviations to the approved method. The compound 1-Butanol requested under this method was reported under EPA SW-846 Method 8260A.
- WTPH-D by WDOE Method NWTPH-Dx. Analytical work was performed with no deviations to the approved method.
- WTPH-G by WDOE Method NWTPH-Gx. Analytical work was performed with no deviations to the approved method.

- IC Anions and Ammonium by EPA SW-846 Method 300.0 and 300.7. Analytical work was performed with no deviations to the approved method for Ammonium, but a deviation was required for the Anions (see comments below).

- The pH by EPA Method 150.1. Analytical work was performed with no deviations to the approved method.

- Percent Solids by EPA Method 160.3. Analytical work was performed with no deviations to the approved method.

- Cyanide by EPA SW-846 Method 9010. Analytical work was performed with no deviations to the approved method.

- All RadChem analyses (TA/TB, AEA's, GEA) were run by internal WDOE accredited WSCF procedures. Analytical work was performed with no deviations to the approved method.

Comments

PCB's – This analysis was originally on the Sample Chain of Custody when received at the WSCF Laboratory, but the client later requested the analysis not be run.

ICP-MS and ICP-AES Metals – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-27, 2-28, 2-29, 2-30, and 2-48 for QC details.

VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-36, 2-37 and 2-38 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Semi-VOA's – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-44, 2-45, 2-46 and 2-47 for QC details. Compounds listed on the tentatively identified peak report with an "N" qualifier have been identified with the program used to interpret the raw data.

Alcohols and Glycols – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-37 for QC details.

WTPH-D – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-40 for details.

WTPH-G – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-39 for details.

IC Anions – The client requested hold time(s) for this analysis was not met. The client was notified and requested WSCF to continue with this analysis. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-33, 2-34 and 2-36 for QC details.

NH4 – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-38 for QC details.

The pH – Per the direction of the chain of custody, the pH was completed within 24 hours of sampling.

Percent Solids – PCB's, VOA's, Semi-VOA's, Alcohols and Glycols, WTPH-G and WTPH-D analytical results were corrected for percent solids. All other analytical results were reported for the sample as received.

CN – The hold time(s) for this analysis was met. A Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-26 for QC details.

RadChem – There are no hold times associated with these WDOE accredited methods. Except for GEA, a Laboratory Control Sample and Duplicate were analyzed with each delivery group per the GPP Letter of Instruction. See page(s) 2-31, 2-32, and 2-35 for QC details.

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.

Troy Dale
WSCF Production Control

Abbreviations

Hg – mercury
IC – ion chromatography
ICP – inductively coupled plasma
ICP/AES – ICP/atomic emission spectroscopy
ICP/MS – ICP/mass spectrometry
Total U – total uranium
AT/TB – total alpha/total beta
AEA – Alpha Energy Analysis
WTPH-G – Total Hydrocarbons-Gasoline
Am – americium
Cm - curium
Pu – plutonium
Np – neptunium
GEA – gamma energy analysis
H3 – Tritium
Sr – Strontium 89, 90
WTPH-D – Total Hydrocarbons-Diesel
TSS – Total Suspended Solids

5/5/03

3-3

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-014	Page 1 of 1

Collector Johansen/Pope/Pfister	Company Contact LC Hulstrom	Telephone No. 373-3928	Project Coordinator TRENT, SJ
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location 216-A-19 (C3245) 22.5-25.0 ft		SAF No. F03-006
Ice Chest No. SML-69	Field Logbook No. HNF-N-3361	COA 117504ES10	Method of Shipment Government Vehicle
Shipped To Waste Sampling & Characterization	Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A

Price Code 8N | Air Quality ☐ | Data Turnaround 30 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None						
Type of Container	aG	Gs*	P	Snap Vial						
No. of Container(s)	1	3	1	1						
Volume	250mL	40mL	500mL	60mL						
SAMPLE ANALYSIS 20030461	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Activity Scan						

000019

Sample No.	Matrix *	Sample Date	Sample Time										
B16RX8 W03020159	SOIL	4-4-03	1348	X	X	X	X						
B16RX9 W03020160	SOIL	4-4-03	1348	X	X	X	X						

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From FH [signature]	4/4/03 1420	Received By/Stored In [signature]	4/4/03 1450
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

** The laboratory is to report both kerosene and diesel range compounds from the WTPH-D analysis.

(1) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G; PCBs - 8082
(2) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(3) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134, Tin-126}; Isotopic Radium {Radium-226, Radium-228}; Isotopic Plutonium; Americium-241; Isotopic Uranium; Trace Elements ICP/MS - 200.8 (Complete) {Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Uranium}; ICP Metals - 6010A (Add-on) {Bismuth, Boron}; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; Cyanide (Total) - 335.2; Cations (IC) - 300.7 {Nitrogen in ammonium}; pH (Soil) - 9045

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-PW-2/200-PW-4			DATA PACKAGE: WSCF20030461		
VALIDATOR: TLL		LAB: WSCF		DATE: 10/18/03	
CASE:			SDG: 30461		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
B16RX8 B16RX9					
				501	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

Continuing calibrations acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes	No	(N/A)
Calibration blank results acceptable? (Levels D, E)	Yes	No	(N/A)
Laboratory blanks analyzed?	(Yes)	No	N/A
Laboratory blank results acceptable?	(Yes)	No	N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes	(No)	N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments: No FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	(Yes)	No	N/A
Surrogate/system monitoring compound recoveries acceptable?	(Yes)	No	N/A
Surrogates traceable? (Levels D, E)	Yes	No	(N/A)
Surrogates expired? (Levels D, E)	Yes	No	(N/A)
MS/MSD samples analyzed?	(Yes)	No	N/A
MS/MSD results acceptable?	(Yes)	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards? (Levels D, E)	Yes	No	(N/A)
LCS/BSS samples analyzed?	(Yes)	No	N/A
LCS/BSS results acceptable?	(Yes)	No	N/A
Standards traceable? (Levels D, E)	Yes	No	(N/A)
Standards expired? (Levels D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	(No)	N/A
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments: No PAS

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes	No	N/A
MS/MSD RPD values acceptable?	Yes	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	N/A
MS/MSD standards expired? (Levels D, E)	Yes	No	N/A
Field duplicate RPD values acceptable?	Yes	No	N/A
Field split RPD values acceptable?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes	No	N/A
Iinternal standard areas acceptable?	Yes	No	N/A
Internal standard retention times acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	No	N/A
Sample holding times acceptable?	Yes	No	N/A

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes	No	N/A
Compound quantitation acceptable? (Levels D, E)	Yes	No	N/A
Results reported for all requested analyses?	Yes	No	N/A
Rresults supported in the raw data? (Levels D, E)	Yes	No	N/A
Samples properly prepared? (Levels D, E)	Yes	No	N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments:

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries aceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:

Appendix 6

Additional Documentation Requested by Client

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: Alcohols, Glycols - 8015

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000158							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	2-Bromoethanol	540-51-2	112.000	%Recove	05/02/03	70.000	125.000
MS	Diethyl ether	60-29-7	114.000	%Recove	05/02/03	75.000	125.000
MS	Ethylene glycol	107-21-1	104.000	%Recove	05/02/03	75.000	125.000
MS	Methanol	67-56-1	114.000	%Recove	05/02/03	75.000	125.000
MSD	2-Bromoethanol	540-51-2	103.000	%Recove	05/02/03	70.000	125.000
MSD	Diethyl ether	60-29-7	114.000	%Recove	05/02/03	75.000	125.000
MSD	Ethylene glycol	107-21-1	118.000	%Recove	05/02/03	75.000	125.000
MSD	Methanol	67-56-1	116.000	%Recove	05/02/03	75.000	125.000
SPK-RPD	2-Bromoethanol	540-51-2	8.372	RPD	05/02/03	0.000	20.000
SPK-RPD	Diethyl ether	60-29-7	0.000	RPD	05/02/03	0.000	20.000
SPK-RPD	Ethylene glycol	107-21-1	12.613	RPD	05/02/03	0.000	20.000
SPK-RPD	Methanol	67-56-1	1.739	RPD	05/02/03	0.000	20.000
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	2-Bromoethanol	540-51-2	100.000	%Recove	05/02/03	70.000	125.000
MS	Diethyl ether	60-29-7	105.000	%Recove	05/02/03	75.000	125.000
MS	Ethylene glycol	107-21-1	100.000	%Recove	05/02/03	75.000	125.000
MS	Methanol	67-56-1	107.000	%Recove	05/02/03	75.000	125.000
MSD	2-Bromoethanol	540-51-2	97.000	%Recove	05/02/03	70.000	125.000
MSD	Diethyl ether	60-29-7	100.000	%Recove	05/02/03	75.000	125.000
MSD	Ethylene glycol	107-21-1	116.000	%Recove	05/02/03	75.000	125.000
MSD	Methanol	67-56-1	114.000	%Recove	05/02/03	75.000	125.000
SPK-RPD	2-Bromoethanol	540-51-2	3.046	RPD	05/02/03	0.000	20.000
SPK-RPD	Diethyl ether	60-29-7	4.878	RPD	05/02/03	0.000	20.000
SPK-RPD	Ethylene glycol	107-21-1	14.815	RPD	05/02/03	0.000	20.000
SPK-RPD	Methanol	67-56-1	6.335	RPD	05/02/03	0.000	20.000
BATCH QC							
BLANK	2-Bromoethanol	540-51-2	100	ug/Kg	05/02/03	0.000	10.000
BLANK	Diethyl ether	60-29-7	<5000	ug/Kg	05/02/03	0.000	10.000
BLANK	Ethylene glycol	107-21-1	<5000	ug/Kg	05/02/03	0.000	5.000
BLANK	Methanol	67-56-1	<1000	ug/Kg	05/02/03	0.000	10.000
LCS	2-Bromoethanol	540-51-2	92.000	%Recove	05/02/03	70.000	130.000
LCS	Diethyl ether	60-29-7	92.000	%Recove	05/02/03	70.000	130.000
LCS	Ethylene glycol	107-21-1	116.000	%Recove	05/02/03	70.000	130.000
LCS	Methanol	67-56-1	102.000	%Recove	05/02/03	70.000	130.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: VOA Ground Water Protection

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
Lab ID: W030000157							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	1,1-Dichloroethene	75-35-4	85.400	% Recov	04/16/03	63.000	117.000
MS	Benzene	71-43-2	120.000	% Recov	04/16/03	75.000	129.000
MS	4-Bromofluorobenzene Surr	460-00-4	91.200	% Recov	04/16/03	84.000	116.000
MS	Chlorobenzene	108-90-7	108.000	% Recov	04/16/03	79.000	119.000
MS	1,2-Dichloroethane-d4 Surr	17060-07-0	110.000	% Recov	04/16/03	82.000	136.000
MS	Toluene-d8 Surr	2037-26-5	108.000	% Recov	04/16/03	89.000	119.000
MS	Toluene	108-88-3	118.000	% Recov	04/16/03	76.000	120.000
MS	Trichloroethene	79-01-6	95.500	% Recov	04/16/03	73.000	123.000
MSD	1,1-Dichloroethene	75-35-4	89.000	% Recov	04/16/03	63.000	117.000
MSD	Benzene	71-43-2	115.000	% Recov	04/16/03	75.000	129.000
MSD	4-Bromofluorobenzene Surr	460-00-4	78.800	% Recov	04/16/03	84.000	116.000 *
MSD	Chlorobenzene	108-90-7	106.000	% Recov	04/16/03	79.000	119.000
MSD	1,2-Dichloroethane-d4 Surr	17060-07-0	115.000	% Recov	04/16/03	82.000	136.000
MSD	Toluene-d8 Surr	2037-26-5	99.600	% Recov	04/16/03	89.000	119.000
MSD	Toluene	108-88-3	110.000	% Recov	04/16/03	76.000	120.000
MSD	Trichloroethene	79-01-6	88.300	% Recov	04/16/03	73.000	123.000
Lab ID: W030000158							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	1,1-Dichloroethene	75-35-4	77.100	% Recov	04/16/03	63.000	117.000
MS	Benzene	71-43-2	113.000	% Recov	04/16/03	75.000	129.000
MS	4-Bromofluorobenzene Surr	460-00-4	86.300	% Recov	04/16/03	84.000	116.000
MS	Chlorobenzene	108-90-7	105.000	% Recov	04/16/03	79.000	119.000
MS	1,2-Dichloroethane-d4 Surr	17060-07-0	120.000	% Recov	04/16/03	82.000	136.000
MS	Toluene-d8 Surr	2037-26-5	103.000	% Recov	04/16/03	89.000	119.000
MS	Toluene	108-88-3	113.000	% Recov	04/16/03	76.000	120.000
MS	Trichloroethene	79-01-6	85.900	% Recov	04/16/03	73.000	123.000
MSD	1,1-Dichloroethene	75-35-4	81.500	% Recov	04/16/03	63.000	117.000
MSD	Benzene	71-43-2	108.000	% Recov	04/16/03	75.000	129.000
MSD	4-Bromofluorobenzene Surr	460-00-4	85.600	% Recov	04/16/03	84.000	116.000
MSD	Chlorobenzene	108-90-7	104.000	% Recov	04/16/03	79.000	119.000
MSD	1,2-Dichloroethane-d4 Surr	17060-07-0	124.000	% Recov	04/16/03	82.000	136.000
MSD	Toluene-d8 Surr	2037-26-5	99.800	% Recov	04/16/03	89.000	119.000
MSD	Toluene	108-88-3	104.000	% Recov	04/16/03	76.000	120.000
MSD	Trichloroethene	79-01-6	86.600	% Recov	04/16/03	73.000	123.000
Lab ID: W030000159							
BATCH QC ASSOCIATED WITH SAMPLE							
MS	1,1-Dichloroethene	75-35-4	86.000	% Recov	04/16/03	63.000	117.000
MS	Benzene	71-43-2	118.000	% Recov	04/16/03	75.000	129.000
MS	4-Bromofluorobenzene Surr	460-00-4	86.400	% Recov	04/16/03	84.000	116.000
MS	Chlorobenzene	108-90-7	104.000	% Recov	04/16/03	79.000	119.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: VOA Ground Water Protection

SAF Number: F03-006
Sample Date: 04/04/03
Receive Date: 04/04/03

QC Type	Analyte		CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
MS	1,2-Dichloroethane-d4	Surr	17060-07-0	118.000	% Recov	04/16/03	82.000	136.000
MS	Toluene-d8	Surr	2037-26-5	101.000	% Recov	04/16/03	89.000	119.000
MS	Toluene		108-88-3	108.000	% Recov	04/16/03	76.000	120.000
MS	Trichloroethene		79-01-6	96.400	% Recov	04/16/03	73.000	123.000
MSD	1,1-Dichloroethene		75-35-4	81.000	% Recov	04/16/03	63.000	117.000
MSD	Benzene		71-43-2	116.000	% Recov	04/16/03	75.000	129.000
MSD	4-Bromofluorobenzene	Surr	460-00-4	96.100	% Recov	04/16/03	84.000	116.000
MSD	Chlorobenzene		108-90-7	110.000	% Recov	04/16/03	79.000	119.000
MSD	1,2-Dichloroethane-d4	Surr	17060-07-0	120.000	% Recov	04/16/03	82.000	136.000
MSD	Toluene-d8	Surr	2037-26-5	106.000	% Recov	04/16/03	89.000	119.000
MSD	Toluene		108-88-3	108.000	% Recov	04/16/03	76.000	120.000
MSD	Trichloroethene		79-01-6	96.800	% Recov	04/16/03	73.000	123.000
SPK-RPD	1,1-Dichloroethene		75-35-4	5.988	RPD	04/16/03	0.000	25.000
SPK-RPD	Benzene		71-43-2	1.709	RPD	04/16/03	0.000	25.000
SPK-RPD	4-Bromofluorobenzene	Surr	460-00-4	10.630	RPD	04/16/03	0.000	25.000
SPK-RPD	Chlorobenzene		108-90-7	5.607	RPD	04/16/03	0.000	25.000
SPK-RPD	1,2-Dichloroethane-d4	Surr	17060-07-0	1.881	RPD	04/16/03	0.000	25.000
SPK-RPD	Toluene-d8	Surr	2037-26-5	4.831	RPD	04/16/03	0.000	25.000
SPK-RPD	Toluene		108-88-3	0.000	RPD	04/16/03	0.000	25.000
SPK-RPD	Trichloroethene		79-01-6	0.414	RPD	04/16/03	0.000	25.000
SURR	4-Bromofluorobenzene	Surr	460-00-4	93.100	% Recov	04/16/03	71.000	125.000
SURR	1,2-Dichloroethane-d4	Surr	17060-07-0	119.000	% Recov	04/16/03	80.000	134.000
SURR	Toluene-d8	Surr	2037-26-5	106.000	% Recov	04/16/03	80.000	126.000

Lab ID: W030000160
BATCH QC ASSOCIATED WITH SAMPLE

SURR	4-Bromofluorobenzene	Surr	460-00-4	97.800	% Recov	04/16/03	71.000	125.000
SURR	1,2-Dichloroethane-d4	Surr	17060-07-0	114.000	% Recov	04/16/03	80.000	134.000
SURR	Toluene-d8	Surr	2037-26-5	114.000	% Recov	04/16/03	80.000	126.000

BATCH QC

BLANK	1,1-Dichloroethene		75-35-4	< 1.0	ug/Kg	04/16/03		
BLANK	1-Butanol		71-36-3	< 10	ug/Kg	04/16/03		
BLANK	Benzene		71-43-2	< 1.0	ug/Kg	04/16/03		
BLANK	4-Bromofluorobenzene	Surr	460-00-4	93.400	% Recov	04/16/03	71.000	125.000
BLANK	Chlorobenzene		108-90-7	< 1.0	ug/Kg	04/16/03		
BLANK	1,2-Dichloroethane-d4	Surr	17060-07-0	119.000	% Recov	04/16/03	80.000	134.000
BLANK	Toluene-d8	Surr	2037-26-5	103.000	% Recov	04/16/03	80.000	126.000
BLANK	Toluene		108-88-3	< 1.0	ug/Kg	04/16/03		
BLANK	Trichloroethene		79-01-6	< 1.0	ug/Kg	04/16/03		
LCS	1,1-Dichloroethene		75-35-4	96.900	% Recov	04/16/03	70.000	130.000
LCS	Benzene		71-43-2	121.000	% Recov	04/16/03	70.000	130.000
LCS	4-Bromofluorobenzene	Surr	460-00-4	91.900	% Recov	04/16/03	71.000	125.000
LCS	Chlorobenzene		108-90-7	97.500	% Recov	04/16/03	70.000	130.000
LCS	1,2-Dichloroethane-d4	Surr	17060-07-0	136.000	% Recov	04/16/03	80.000	134.000 *
LCS	Toluene-d8	Surr	2037-26-5	105.000	% Recov	04/16/03	80.000	126.000

WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: WSCF20030461
Matrix: SOLID
Test: VOA Ground Water Protection

SAF Number: F03-006
Sample Date:
Receive Date:

QC Type	Analyte	CAS #	Results	Units	Analysis Date	Lower Limit	Upper Limit
LCS	Toluene	108-88-3	104.000	% Recov	04/16/03	70.000	130.000
LCS	Trichloroethene	79-01-6	99.700	% Recov	04/16/03	70.000	130.000